

## **Consideration of Comments on the Second Draft of the PRC-006-1 - Underfrequency Load Shedding Program Requirements — Project 2007-01**

The Underfrequency Load Shedding Standard Drafting Team (UFLS SDT) thanks all commenters who submitted comments on PRC-006-1 – Automatic Underfrequency Load Shedding. The standard was posted for a 30-day public comment period from April 20- May 21, 2009. Stakeholders were asked to provide feedback on the document through a special electronic standard comment form. There were 45 sets of comments, including comments from more than 120 different people from over 80 companies representing all of the 10 Industry Segments as shown in the table on the following pages.

### **Summary of Changes:**

The applicability section of the second draft of the standard included “Distribution Providers” and “Transmission Owners with end-use Load connected to their Facilities where such end use load is not part of a Distribution Provider’s load.” This second draft language reflected the SDT’s intent to establish the applicable entities in the UFLS standard to be those entities that supply UFLS capability. However, as a result of comments submitted in the second posting and further discussions within the SDT, the SDT now believes that the identification of the applicable entities was not an entirely accurate reflection of the participating registered entities. Therefore, the applicability section was modified. The SDT is now proposing that “UFLS entities” within the standard shall mean all entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Such entities may include Transmission Owners and/or Distribution Providers. The concept to define a group of entities within the body of the standard in the Applicability section currently exists in the CIP-002-1. In addition, the SDT included Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators in the applicability section of the standard. Transmission Owners would be subject to the standard if they have been identified by the group of Planning Coordinators as having the obligation to switch certain Elements as part of the UFLS program.

In the second posting, many of the requirements were assigned to groups of Planning Coordinators. These groups were to consist of all the Planning Coordinators within each of the Regional Entity footprints. The SDT has now revised these assignments to replace the groups with individual Planning Coordinators due to difficulties involved in assigning responsibilities to groups that do not currently exist. In the revised standard, each Regional Entity footprint must be designated as an island for UFLS program design assessment purposes. While the individual Planning Coordinator UFLS program designs maybe different, this amendment will preserve a measure of coordination at the regional level.

The SDT has revised the under and overfrequency performance characteristics to refer to under and overfrequency curves (as Attachments 1 and 2) rather than discrete points as in former drafts. The SDT believes that curves provide more uniform coordination with generator under and overfrequency tripping requirements being proposed in PRC-024-1. In addition, the team extended the underfrequency performance characteristic curve to 60 seconds from the previous 30 second duration. The team agreed to extend the underfrequency performance characteristic to permit the MRO Region to avoid having to specify a variance to cover instances where there may be slower recovery of frequency. The SDT believes that recovery of frequency within 60 seconds, though somewhat less stringent than requiring recovery within 30 seconds, remains acceptable for reliability and for coordination with generator underfrequency tripping. The SDT has similarly substituted the discrete points used in former drafts, for identifying which generator trip settings need to be included in the assessments of UFLS program design, with curves. These curves are shown on the same graphs as the performance characteristic curves (in Attachments 1 and 2) and are the same curves as are being proposed in PRC-024-1 for generator under and overfrequency tripping, thus ensuring explicit coordination between UFLS and generator tripping.

The SDT has modified the approach for ensuring coordination between regions and for selecting islands that overlap adjacent regions within an interconnection. The SDT has deleted the requirement that involved the development of procedures for coordination between groups of Planning Coordinators in neighboring regions in selecting interregional islands (version 2 of draft standard Requirement R4). In version 3 of the draft standard, any Planning Coordinator may now select islands including interconnected portions of the BES in adjacent Planning Coordinator footprints and Regional Entity footprints, without the need for coordinating this selection with neighboring regions. The SDT has added a requirement for the Planning Coordinators to reach concurrence on the UFLS assessments for any islands identified by anyone Planning Coordinator that encompass more than one Planning Coordinator footprint. This revised approach to interregional coordination is contained in Requirements R5 and R13.

Some commenters noted that switching of certain transmission facilities is sometimes necessary to be carried out as part of a UFLS program design. The SDT agreed and has added Requirement R10 which requires Transmission Owners to provide automatic switching of Elements in accordance with the UFLS program design should a Planning Coordinator determine that such switching is a necessary part of the UFLS program design.

The SDT has added requirements to include an assessment of the performance of UFLS programs “within one year of an actuation of UFLS resulting in a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program.”(Requirement R11). Requirement R12 requires the Planning Coordinator, in whose islanding event assessment (per R11) UFLS program deficiencies are identified, to conduct and document a UFLS design assessment to consider the identified deficiencies within two years of event actuation. Lastly, Requirement R13 requires the Planning Coordinator, in whose footprint a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, to reach concurrence with the other affected Planning Coordinators on the event assessment results before event assessment completion. In the former drafts, event analysis was left to be covered by the NERC Rules of Procedure. However, the drafting team believes that including a requirement in this standard for UFLS event analysis is a more appropriate mapping of PRC-009-0 Requirement R1 which will be replaced by this standard, PRC-006-1.

Earlier in 2009, NPCC identified the need for a variance to the standard for the Québec Interconnection within NPCC. Due to the physical characteristics of the Québec system the UFLS program in Québec arrests frequency at a lower threshold and permits higher frequency overshoot than allowed in the proposed standard. The installed generation in the Québec Interconnection is 98 percent hydraulic generation, allowing wider tolerances on frequency performance without jeopardizing reliability. The variance also establishes a different capacity threshold for the generating units for which underfrequency and overfrequency trip settings must be modeled to address concerns that by 2020, 10 percent of the installed capacity in Québec may be located at plants less than 75 MVA. The Standards Committee appointed a member from the Québec Interconnection to the drafting team to develop the variance for Québec. Working closely with this representative, the team developed the variance to Requirement R3 Parts 3.1 and 3.2 and Requirement R4 Parts 4.1 through 4.6. The variance to these requirements reference separate under frequency and overfrequency curves included as attachments 1A and 2A to the standard.

In reviewing the responses to comments on the second posting, several commenters noted that certain requirements in the exiting EOP-003-1 standard conflict or are redundant with the requirements being proposed by this SDT. The team agreed with these commenters and felt that if left unaddressed, the redundancies and conflicts could result in compliance issues in the future. As a result, the team submitted a request to supplement the existing SAR for Project 2007-01 to include a revision to EOP-003-1 in order to exclude those requirements related to automatic underfrequency load shedding since PRC-006-1 will contain these. The Standards Committee approved this action and the team moved forward with revising the existing EOP-003-1 requirements. The team is presenting these modifications to the EOP-003-1

requirements in this third posting of the standard and would like industry feedback on the revisions noting that the changes were conducted with the limited purpose of removing automatic underfrequency load shedding from the scope of EOP-003. Two other drafting teams are already in place to review the other aspects of EOP-003 as part of Project 2009-02 – Real-time Tools and Project 2009-03 – Emergency Operations.

The team debated whether or not, in Requirement R4, Parts 4.1 through 4.6, to include under and over frequency trip settings only for generators connected to the BES above the stated size thresholds, or all generators above the stated size thresholds whether BES connected or not, though practically limited to 60 kV and above connections. The question here is not applicable to Generator Owners, but simply whether generator under frequency trip settings above the (proposed) under frequency curve in PRC-024-1, and generators with over frequency trip settings below the (proposed) PRC-024-1 over frequency curve, should be represented in the UFLS design assessments.

Limiting Requirement R4, Parts 4.1 through 4.6, to BES connected generation would be consistent with the NERC Statement of Compliance Registry Criteria. It was also noted that some generators on lower voltage systems above the size thresholds may not be modeled, or that they are sometimes lumped with load in planning base cases such that there could be inconsistent enforcement of this requirement if it were extended to include generators not connected to the BES. On the other hand, a distinction between BES and non-BES tripped generation is immaterial to system frequency; the amount of generation that could potentially be tripped during a frequency event is the only relevant factor. Limiting Requirement R4 to BES connected generation would also be inconsistent with PRC-024-1 Applicability Section 4.2 in its current draft (draft #2 not yet posted for comment) which includes generation down to 60 kV.

The SDT limited Requirement R4 to generators connected to the BES only. Note that this same issue also applies to Requirement R3, Part 3.3, in the monitoring of V/Hz at generators.

[http://www.nerc.com/filez/standards/Underfrequency\\_Load\\_Shedding.html](http://www.nerc.com/filez/standards/Underfrequency_Load_Shedding.html)

If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process! If you feel there has been an error or omission, you can contact the Vice President and Director of Standards, Gerry Adamski, at 609-452-8060 or at [gerry.adamski@nerc.net](mailto:gerry.adamski@nerc.net). In addition, there is a NERC Reliability Standards Appeals Process.<sup>1</sup>

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<sup>1</sup> The appeals process is in the Reliability Standards Development Procedures: <http://www.nerc.com/standards/newstandardsprocess.html>.

## Index to Questions, Comments, and Responses

1. The UFLS programs typically have been developed within each Region by representatives from the vertically integrated utilities, Control Areas, power pools, etc. in that Region. The SDT initially proposed that all UFLS requirements be contained within regional UFLS standards to utilize specific expertise within the regions and recognize that UFLS programs can be successfully coordinated if they are designed to achieve the same system performance characteristics, even across interconnected regions. However, based on the rationale contained in the background, the SDT has developed a continent wide standard consistent with the historical practice that promotes the utilization of previous experience and expertise. As proposed, the continent-wide standard requires that all Planning Coordinators within a Region work together as a group to develop the UFLS program for that Region that conforms to the performance characteristics. .... 13
- b. Do you agree that the SDT has assigned responsibility to the appropriate entity?  
20
2. The SDT has strived to draft the applicability in a manner that includes all load while avoiding assigning applicability to more than one entity for the same load. The Functional Model indicates the Distribution Provider is not defined by a specific voltage, but rather as performing the Distribution function at any voltage. Considering the Functional Model definition of Distribution Providers please indicate whether you believe it is necessary to assign applicability to "Transmission Owners with end-use Load connected to their Facilities where such end-use load is not part of a Distribution Provider's load". .... 33
4. The SDT added a requirement that requires the Planning Coordinators model, in the five year assessments, any automatic load restoration that is designed to assist in stabilizing system frequency (Requirement R9). The team decided to add this requirement as a result of a comment during the first posting. Do you agree that this requirement is necessary for reliability? ..... 55
5. In the first posting, the Characteristics of UFLS Regional Reliability Standards required that UFLS programs be designed to limit the potential for overexcitation (V/Hz) of power system equipment at all Bulk Electric System buses. Based on industry comments, the SDT has revised this requirement in the proposed continent-wide standard to apply only at generator buses and generator step-up transformer high-side buses associated with individual generating units greater than 20 MVA (gross nameplate rating) and generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) that are directly connected to the BES. The SDT believes this change better addresses the need to have UFLS programs designed to coordinate with protection that may trip generators during an underfrequency event. Do you agree with this change?..... 62
6. In the first posting, the Characteristics of UFLS Regional Reliability Standards required that UFLS programs be designed to limit the potential for overexcitation (V/Hz) of power system equipment at all Bulk Electric System buses. Based on industry comments, the SDT has revised this requirement in the proposed continent-wide standard to apply only at generator buses and generator step-up transformer high-side buses associated with individual generating units greater than 20 MVA (gross nameplate rating) and generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) that are directly connected to the BES. The SDT believes

this change better addresses the need to have UFLS programs designed to coordinate with protection that may trip generators during an underfrequency event. Do you agree with this change?..... 72

7. If you are aware of any conflicts between the proposed standard and any regulatory function, rule order, tariff, rate schedule, legislative requirement, or agreement please identify the conflict in the comments section. .... 83

8. Please provide any other comments (that you have not already provided in response to the questions above) that you have on the draft standard PRC-006-1. ... 85

**The Industry Segments are:**

- 1 — Transmission Owners
- 2 — RTOs, ISOs
- 3 — Load-serving Entities
- 4 — Transmission-dependent Utilities
- 5 — Electric Generators
- 6 — Electricity Brokers, Aggregators, and Marketers
- 7 — Large Electricity End Users
- 8 — Small Electricity End Users
- 9 — Federal, State, Provincial Regulatory or other Government Entities
- 10 — Regional Reliability Organizations, Regional Entities

		Commenter	Organization	Industry Segment										
				1	2	3	4	5	6	7	8	9	10	
1.	Group	Brian Bartos	TRE UFLS Standard Drafting Team	X	X			X		X				
		<b>Additional Member</b>	<b>Additional Organization</b>	<b>Region</b>						<b>Segment Selection</b>				
		1. Randy Jones	Calpine	ERCOT						5				
		2. Raborn Reader	EPCO	ERCOT						NA				
		3. Eddy Reece	Rayburn Country Electric Coop.	ERCOT						NA				
		4. Barry Kremling	Guadalupe Valley Electric Coop.	ERCOT						NA				
		5. Sergio Garza	Lower Colorado River Authority	ERCOT						5				
		6. Steve Myers	ERCOT ISO	ERCOT						2				
		7. Ken McIntyre	ERCOT ISO	ERCOT						2				
		8. Dennis Kunkel	AEP	ERCOT						1				
		9. Matt Pawlowski	NextEra	ERCOT						5				
2.	Group	Richard Kafka	Pepco Holdings, Inc - Affiliates	X		X		X	X					
		<b>Additional Member</b>	<b>Additional Organization</b>	<b>Region</b>						<b>Segment Selection</b>				
		1. David O'Connor	Potomac Electric Power Co	RFC						1				
		2. Dave Thorne	Potomac Electric Power Co	RFC						1				
		3. Vic Davis	Delmarva Power & Light	RFC						1				

**Consideration of Comments on Underfrequency Load Shedding Program Requirements — Project 2007-01**

	Commenter	Organization	Industry Segment											
			1	2	3	4	5	6	7	8	9	10		
4.	John Keller	Atlantic City Electric	RFC									1		
5.	Walt Blackwell	Potomac Electric Power Co	RFC									1		
6.	Alvin Depew	Potomac Electric Power Co	RFC									1		
3.	Group	Denise Koehn	Bonneville Power Administration	X		X		X	X					
<b>Additional Member</b>		<b>Additional Organization</b>		<b>Region</b>						<b>Segment Selection</b>				
1.	Kelly Johnson	Transmission Customer Service Engineering	WECC									1		
2.	Greg Vasallo	Transmission Customer Service Engineering	WECC									1		
3.	Larry Furumasu	Transmission Planning	WECC									1		
4.	Group	Guy Zito	Northeast Power Coordinating Council											X
<b>Additional Member</b>		<b>Additional Organization</b>		<b>Region</b>						<b>Segment Selection</b>				
1.	Ralph Rufrano	New York Power Authority	NPCC									5		
2.	Alan Adamson	New York State Reliability Council	NPCC									10		
3.	Greg Campoli	New York Independent System Operator	NPCC									2		
4.	Roger Champagne	Hydro-Quebec TransEnergie	NPCC									2		
5.	Kurtis Chong	Independent Electricity System Operator	NPCC									2		
6.	Sylvain Clermont	Hydro-Quebec TransEnergie	NPCC									1		
7.	Manuel Couto	National Grid	NPCC									1		
8.	Chris de Graffenried	Consolidated Edison Co. of New York, Inc.	NPCC									1		
9.	Brian Evans-Mongeon	Utility Services	NPCC									8		
10.	Mike Garton	Dominion Resources Services, Inc.	NPCC									5		
11.	Michael Gildea	Constellation Energy	NPCC									6		
12.	Brian Gooder	Ontario Power Generation Incorporated	NPCC									5		
13.	Kathleen Goodman	ISO - New England	NPCC									2		
14.	David Kiguel	Hydro One Networks Inc.	NPCC									1		
15.	Michael Lombardi	Northeast Utilities	NPCC									1		
16.	Randy MacDonald	New Brunswick System Operator	NPCC									2		
17.	Bruce Metruck	New York Power Authority	NPCC									6		

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	Commenter	Organization	Industry Segment											
			1	2	3	4	5	6	7	8	9	10		
18.	Robert Pellegrini	The United Illuminating Company	NPCC							1				
19.	Michael Schiavone	National Grid	NPCC							1				
20.	Michael Sonnelitter	FPL Energy/NextEra Energy	NPCC							5				
21.	Peter Yost	Consolidated Edison Co. of New York, Inc.	NPCC							3				
22.	Lee Pedowicz	Northeast Power Coordinating Council	NPCC							10				
23.	Gerry Dunbar	Northeast Power Coordinating Council	NPCC							10				
5.	Group	Jim Busbin	Southern Company		X		X		X					
<b>Additional Member</b>		<b>Additional Organization</b>		<b>Region</b>			<b>Segment Selection</b>							
1.	J. T. Wood	Southern Company Services, Inc.		SERC			1							
2.	Hugh Francis	Southern Company Services, Inc.		SERC			1							
3.	Bill Shultz	Southern Company Services, Inc.		SERC			5							
4.	Phil Winston	Georgia Power Company		SERC			3							
5.	Jonathan Glidewell	Southern Company Services, Inc.		SERC			1							
6.	Marc Butts	Southern Company Services, Inc.		SERC			1							
6.	Group	Ken McIntyre	ERCOT ISO			X								
<b>Additional Member</b>		<b>Additional Organization</b>		<b>Region</b>			<b>Segment Selection</b>							
1.	Steve Myers	ERCOT ISO		ERCOT			2							
2.	John Schmall	ERCOT ISO		ERCOT										
7.	Group	Jalal Babik	Electric Market Policy		X		X		X	X				
<b>Additional Member</b>		<b>Additional Organization</b>		<b>Region</b>			<b>Segment Selection</b>							
1.	Louis Slade			SERC			6							
2.	Mike Garton			NPCC			5							
8.	Group	Jason L. Marshall	Midwest ISO Stakeholders Standards Collaborators			X								
<b>Additional Member</b>		<b>Additional Organization</b>		<b>Region</b>			<b>Segment Selection</b>							
1.	Lee Kittleson	Otter Tail Power		MRO			1							
2.	Michael Ayotte	ITC Holdings		RFC			1							

Consideration of Comments on Underfrequency Load Shedding Program Requirements — Project 2007-01

		Commenter	Organization	Industry Segment											
				1	2	3	4	5	6	7	8	9	10		
9.	Group	Bob Jones	SERC UFLS Standards Drafting Team	X											
		<b>Additional Member</b>	<b>Additional Organization</b>	<b>Region</b>						<b>Segment Selection</b>					
		1. Rick Foster	Ameren Services Co.	SERC						1					
		2. John O'Connor	Progress Energy Carolinas	SERC						1					
		3. Pat Huntley	SERC Reliability Corp.	SERC						10					
		4. Jonathan Glidewell	Southern Co. Services	SERC						1					
		5. Tom Cain	TVA	SERC						1					
10.	Group	Peter A. Heidrich	FRCC Standards & Operations Departments												X
		<b>Additional Member</b>	<b>Additional Organization</b>	<b>Region</b>						<b>Segment Selection</b>					
		1. Linda Campbell	Florida Reliability Coordinating Council	FRCC						10					
		2. Eric Senkowicz	Florida Reliability Coordinating Council	FRCC						10					
11.	Group	Frank Gaffney	Florida Municipal Power Agency and Select Members	X		X	X	X						X	
		<b>Additional Member</b>	<b>Additional Organization</b>	<b>Region</b>						<b>Segment Selection</b>					
		1. Rich Kinas	Orlando Utilities Commission	FRCC						1, 3, 5					
		2. Jim Howard	Lakeland Electric	FRCC						1, 3, 5					
		3. Greg Woessner	Kissimmee Utilities Authority	FRCC						1, 3, 5					
		4. Cairo Venegas	Fort Pierce Utilities	FRCC						1, 3, 5					
12.	Group	Michael Brytowski	MRO NERC Standards Review Subcommittee												X
		<b>Additional Member</b>	<b>Additional Organization</b>	<b>Region</b>						<b>Segment Selection</b>					
		1. Carol Gerou	MRO	MRO						10					
		2. Neal Balu	WPS	MRO						3, 4, 5, 6					
		3. Joe DePoorter	MGE	MRO						3, 4, 5, 6					
		4. Ken Goldsmith	ALTW	MRO						4					
		5. Jim Haigh	WAPA	MRO						1, 6					
		6. Terry Harbour	MEC	MRO						1, 3, 5, 6					

Consideration of Comments on Underfrequency Load Shedding Program Requirements — Project 2007-01

		Commenter	Organization	Industry Segment									
				1	2	3	4	5	6	7	8	9	10
7.	Joseph Knight	GRE	MRO									1, 3, 5, 6	
8.	Scott Nickels	RPU	MRO									3, 4, 5, 6	
9.	Dave Rudolph	BEPC	MRO									3, 4, 5, 6	
10.	Eric Ruskamp	LES	MRO									1, 3, 5, 6	
11.	Terry Bilke	MISO	MRO									2	
13.	Group	Michael Gammon	Kansas City Power & Light	X		X		X	X				
		<b>Additional Member</b>	<b>Additional Organization</b>	<b>Region</b>						<b>Segment Selection</b>			
1.	Tim Hinken	Kansas City Power & Light	SPP									1, 3, 5, 6	
2.	Nick McCarty	Kansas City Power & Light	SPP									1, 3, 5, 6	
3.	Jerry Hatfield	Kansas City Power & Light	SPP									1, 3, 5, 6	
14.	Group	Ben Li	IRC Standards Review Committee		X								
		<b>Additional Member</b>	<b>Additional Organization</b>	<b>Region</b>						<b>Segment Selection</b>			
1.	James Castle	NYISO										2	
2.	Anita Lee	AESO										2	
3.	Charles Yeung	SPP										2	
4.	Bill Phillips	MISO										2	
5.	Matt Goldberg	ISO-NE										2	
6.	Steve Myers	ERCOT										2	
7.	Patrick Brown	PJM										2	
15.	Individual	Russell A. Noble	Cowlitz County PUD			X							
16.	Individual	Edward C. Stein	Edward C. Stein - Self									X	
17.	Individual	Harvie Beavers	Colmac Clarion					X					
18.	Individual	Elvin Epting	City of Bedford			X							
19.	Individual	Ray Phillips	Alabama Municipal Electric Authority				X						

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				1	2	3	4	5	6	7	8	9	10	
20.	Individual	Karl Bryan	US Army Corps of Engineers					X						
21.	Individual	Tom Nappi	NIPSCO	X		X		X						
22.	Individual	Kenneth D. Brown b/h Joseph Lalier, Design Engineer Electric Delivery Planning	Public Service Electric and Gas Company	X		X								
23.	Individual	Steve Alexanderson	Central Lincoln			X								
24.	Individual	Shawn Jacobs	SPP System Protection and Control Working Group	X	X	X								X
25.	Individual	Jonathan Appelbaum	Long island power Authority	X										
26.	Individual	Eric Mortenson	Exelon	X		X		X						
27.	Individual	Rao Somayajula	ReliabilityFirst Corporation											X
28.	Individual	Ronnie Frizzell	Arkansas Electric Cooperative Corporation				X							
29.	Individual	Greg Davis	System Protection & Control	X		X								
30.	Individual	Greg Rowland	Duke Energy	X		X		X	X					
31.	Individual	Anthony Jablonski	Reliability First											X
32.	Individual	Bob Thomas, Kevin Wagner, Troy Fodor, Scott Robison	Illinois Municipal Electric Agency				X							
33.	Individual	Roger Champagne	Hydro-Québec TransEnergie (HQT)	X										

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				1	2	3	4	5	6	7	8	9	10	
34.	Individual	Jim Sorrels	AEP	X		X		X	X					
35.	Individual	Vladimir Stanisic	Ontario Power Generation					X	X					
36.	Individual	Joe Springhetti	We Energies			X	X	X						
37.	Individual	Sandra Shaffer	PacifiCorp	X		X		X	X					
38.	Individual	Mike Sonnelitter	NextEra Energy Resources, LLC					X						
39.	Individual	Jason Shaver	American Transmission Company	X										
40.	Individual	Rick Terrill	Luminant Power					X						
41.	Individual	Kirit Shah	Ameren	X		X		X	X					
42.	Individual	Doug Hohlbaugh	FirstEnergy Corp	X		X	X	X	X					
43.	Individual	Armin Klusman	CenterPoint Energy	X										
44.	Individual	Dan Rochester	Independent Electricity System Operator		X									
45.	Individual	Alice Murdock	Xcel Energy	X		X		X	X					

1. **The UFLS programs typically have been developed within each Region by representatives from the vertically integrated utilities, Control Areas, power pools, etc. in that Region. The SDT initially proposed that all UFLS requirements be contained within regional UFLS standards to utilize specific expertise within the regions and recognize that UFLS programs can be successfully coordinated if they are designed to achieve the same system performance characteristics, even across interconnected regions. However, based on the rationale contained in the background, the SDT has developed a continent wide standard consistent with the historical practice that promotes the utilization of previous experience and expertise. As proposed, the continent-wide standard requires that all Planning Coordinators within a Region work together as a group to develop the UFLS program for that Region that conforms to the performance characteristics.**
  - a. Do you agree that creating a continent wide standard preserves the intent of utilizing specific expertise within the regions to develop UFLS programs that meet common performance characteristics?

#### **Summary Consideration:**

- Most commenters agreed that creating a continent wide standard preserves the intent of utilizing specific expertise within the regions to develop UFLS programs that meet common performance characteristics.
- Commenters suggested that regions might want to develop more detailed or stringent requirements. If a Region wants to develop more stringent requirements the Region may elect to develop a regional standard. The creation of a continent wide standard does not prohibit the creation of regional standards. Several commenters also indicated the need for a Variance. The SDT is proposing a Variance for Hydro-Quebec in the third posting of the standard. Other requests for variances or regional standards should follow the procedure outlined in the NERC Rules of Procedure Appendix 3A – Variances to NERC Reliability Standards and Section 312 - Regional Reliability Standards.
- Some comments indicated concern with the term “consistent” in Requirement R2 of the standard. The SDT developed the performance characteristics so that a “program” could be tailored to the needs of each region; however; at the same time not interfering with adjacent regions. The SDT did not intend that a “program” could have only one set of requirements, such as one set of drop frequencies or one specific percent load drop, for an entire region. A “program” could be made up of different sections or sub regional systems identified as islands with different or the same requirements where consistent application of the applicable program requirements are applied in each island. The SDT merged Requirement R2 into Requirement R6 (now Requirement R3 in the in the third version of the standard) and removed the term “consistent” in the requirement.

Organization	Yes or No	Question 1a Comments:
IRC Standards Review Committee	No	By definition, a continent wide standard intends to direct all regions into a consistent requirement and requires regions with varying practices to agree to a single standard. We support the approach taken in PRC-006-01 that specifies only the upper and lower bounds of UFLS protection requirements. We believe this is a reasonable approach to establish continent-wide requirements and allow regional expertise to design their regional UFLS programs. We agree with the proposal to preserve the intent of utilizing specific expertise within the regions to develop UFLS programs, but do not agree with the applicability and the way the standard is written to hold the Group of Planning Coordinators responsible for the requirements. Please see our comments under Q1b
<b>Response: Thank you for your support to the continent-wide approach. See the response provided for the comment under Q1b.</b>		
Ameren	No	It seems that regional standards with continent-wide performance characteristics would be the best mechanism to achieve this purpose. The only reason to have a continent wide standard to is to subscribe to the NERC process. There seems to be more focus on the process than the ultimate goal.
<b>Response: The SDT has focused on both the ultimate goal and the process to achieve the goal. We believe the ultimate goal is to have regionally developed UFLS programs that are coordinated across and between regions. As drafted, the proposed standard does not preclude the development of regional standards. The standard directs responsibility to the Planning Coordinators but allows them to develop/establish the UFLS program requirements in any manner they deem appropriate as long as they conform to the performance characteristics.</b>		
Independent Electricity System Operator	No	Further, we propose the scope of the standard be revised to clearly indicate that it focuses on the global events, as follows: To establish design and documentation requirements for automatic underfrequency load shedding (UFLS) programs to arrest declining frequency and assist recovery of frequency following widespread underfrequency events.
<b>Response: The SDT does not agree with the inclusion of word “widespread” because of the numerous difficulties in defining “widespread” and the lack of completeness of the intent. The draft standard requires consideration of appropriate potential islands. Such islands may be widespread in some people’s minds and not so in others. Widespread, if viewed from a square mile perspective, could include large rural areas with little “critical” load. “Critical” urban load in relatively small concentrated geographic footprints may not necessarily fit within a widespread definition. The drafted purpose allows all these conditions to be included as appropriate with the programs to cover the relevant impacts to the bulk electric system.</b>		
NIPSCO	No	It really depends on how this is accomplished.
<b>Response: The SDT encourages the commenter to provide more specifics in the next posting for SDT consideration.</b>		

**Consideration of Comments on Underfrequency Load Shedding Program Requirements — Project 2007-01**

Organization	Yes or No	Question 1a Comments:
Duke Energy	No	R2 requires consistent application across the region. As long as R6 is met, there should be no requirement for all systems within the region to be consistent. This will create unnecessary work to redesign systems that could meet R6 just because they are not consistent with other systems in the region. Recommend deleting the words consistent application across from R2. This is similar to not requiring the regions to be consistent as long as R6 is met.
<b>Response: The SDT merged Requirement R2 into Requirement R6 (now Requirement R3 in the in the third version of the standard) and removed the term “consistent” in the requirement.</b>		
We Energies	No	We agree that a continent wide standard should be developed. However, we disagree with the approach taken with this draft of the standard. See our question 8 comments for more detail.
<b>Response: Thank you for the support of a continent-wide standard. See the response to your comments on Question 8.</b>		
TRE UFLS Standard Drafting Team	Yes	The Texas Regional Entity Underfrequency Load Shedding Standard Drafting Team (TRE UFLS SDT) is pleased to provide these comments. These comments reflect the consensus of this specific regional standard drafting team and do not reflect the position of the Texas Regional Entity or ERCOT. The TRE UFLS SDT agrees that the basic common characteristics associated with the proposed UFLS standard provides for an appropriate level of required coordination within and, where applicable, between regions.
<b>Response: Thank you for your comment.</b>		
Pepco Holdings, Inc - Affiliates	Yes	The PHI Affiliates agree that the Planning Coordinators have their own expertise and access to the expertise of the TOs and DPs in their area.
<b>Response: Thank you for your support to the continent-wide approach.</b>		
Bonneville Power Administration	Yes	The continent-wide standard is a MINIMUM. Regions may still apply a higher standard.
<b>Response: If a Region wants to develop more stringent requirements the Region may elect to develop a regional standard. The creation of a continent wide standard does not prohibit the creation of regional standards. Requests for variances or regional standards should follow the procedure outlined in the NERC Rules of Procedure Appendix 3A – Variances to NERC Reliability Standards and Section 312 - Regional Reliability Standards.</b>		
SERC UFLS Standards	Yes	We agree that creating a continent wide standard will preserve the intent of utilizing specific expertise within the

Organization	Yes or No	Question 1a Comments:
Drafting Team		region to develop UFLS schemes. First of all, this approach will provide uniformity among the regions for developing UFLS schemes, as all the regions will follow a consistent performance characteristics specified in the standard. At the same time, the regions will have the flexibility to develop their own requirements to meet their specific needs.
<b>Response: Thank you for your comment.</b>		
Southern Company	Yes	Southern Company agrees with the comments submitted by the SERC Region for all questions in this comment form. Submitted SERC responses are essentially replicated in the responses we submit for Southern Company for questions 1-8. *****We agree that creating a continent wide standard will preserve the intent of utilizing specific expertise within the region to develop UFLS schemes. First of all, this approach will provide uniformity among the regions for developing UFLS schemes, as all the regions will follow consistent performance characteristics specified in the standard. At the same time, the regions will have the flexibility to develop their own requirements to meet their specific needs.
<b>Response: Thank you for your comment.</b>		
FRCC Standards & Operations Departments	Yes	We agree with the concept of the development of a Regional UFLS program that conforms to the common performance characteristics contained in the draft standard; however it is not clear what constitutes a 'region'. The SDT has repeatedly used the capitalized version ('Region') of the word in all of the associated documents (i.e. background, comment form) and reverted back to lower case version (region) in the standard. We believe that 'region' should be defined in the standard and incorporated into the NERC Glossary of Terms. This will ensure that the appropriate scope is applied in the development of Regional UFLS programs.
<b>Response: The SDT intended “region” to relate to the traditional sense of a RRO with defined boundaries and that is in the NERC Glossary, although somewhat out of date. The SDT did inadvertently capitalize the word “region” in the associated documents but did use it appropriately in the standard. The SDT has replaced “region” with “Regional Entity footprint.”</b>		
US Army Corps of Engineers	Yes	The continent wide standard establishes the performance characteristics that must be met and requiring the PCs within a Region to develop the specifics allows the implementation of the Rel Stndrd to also include local variances and has the added benefit of maintaining planning expertise.
<b>Response: Thank you for your support to the continent-wide approach.</b>		
Public Service Electric and Gas Company	Yes	The creation of a continent wide standard is acceptable as long as the responsibility for developing a UFLS program remains with the Planning Coordinators/Authorities in the Regions.

Organization	Yes or No	Question 1a Comments:
<b>Response: Thank you for your support to the continent-wide approach.</b>		
System Protection & Control	Yes	A continent wide standard will create desired system performance criteria, while allowing flexibility within the regions.
<b>Response: Thank you for your support to the continent-wide approach.</b>		
AEP	Yes	As each Reliability Coordinator has it's own UFLS requirements, the UFLS programs between the Reliability Coordinator's need to work together.
<b>Response: Thank you for your comment. Reliability Coordinators are not included in this standard because this standard addresses only multi-step automatic relay tripping and load shedding, not manual load shedding. The draft standard includes requirements to ensure coordination within a region by designating each Regional Entity footprint as a required island for which the performance characteristics must be satisfied, and by requiring Planning Coordinator concurrence on UFLS design assessment results on those islands.</b>		
PacifiCorp	Yes	PacifiCorp believes that the standard language is general enough to allow for regional differences. It is appropriate that the standard addresses what the parameters are, not how the parameters are to be implemented.
<b>Response: Thank you for your support to the continent-wide approach.</b>		
Northeast Power Coordinating Council	Yes	
ERCOT ISO	Yes	
Electric Market Policy	Yes	
Midwest ISO Stakeholders Standards Collaborators	Yes	
Florida Municipal Power Agency and Select Members	Yes	

**Consideration of Comments on Underfrequency Load Shedding Program Requirements — Project 2007-01**

Organization	Yes or No	Question 1a Comments:
MRO NERC Standards Review Subcommittee	Yes	
Kansas City Power & Light	Yes	
Cowlitz County PUD	Yes	
Edward C. Stein	Yes	
Colmac Clarion	Yes	
City of Bedford	Yes	
Alabama Municipal Electric Authority	Yes	
Central Lincoln	Yes	
SPP System Protection and Control Working Group	Yes	
Long island power Authority	Yes	
Exelon	Yes	
ReliabilityFirst Corporation	Yes	
Arkansas Electric Cooperative Corporation	Yes	

**Consideration of Comments on Underfrequency Load Shedding Program Requirements — Project 2007-01**

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Organization	Yes or No	Question 1a Comments:
ReliabilityFirst	Yes	
Illinois Municipal Electric Agency	Yes	
Hydro-Québec TransEnergie (HQT)	Yes	
Ontario Power Generation	Yes	
NextEra Energy Resources, LLC	Yes	
American Transmission Company	Yes	
Luminant Power	Yes	
FirstEnergy Corp	Yes	
Xcel Energy	Yes	

**b. Do you agree that the SDT has assigned responsibility to the appropriate entity?**

**Summary Consideration:**

1. Some commenters expressed concern over the “group” concept for Planning Coordinators and how it would be implemented. The SDT has removed the group concept from the standard. The applicability has been changed to individual Planning Coordinators. The SDT acknowledges the legal and compliance difficulties involved in requiring that Planning Coordinators join a group that does not presently exist.
2. While some commenters agreed with the concept of the coordinated effort to design an underfrequency load shedding program, they expressed a need to establish an entity with the overall responsibility of coordinating the efforts of the Planning Coordinators. These commenters recommended that the Regional Entity be responsible for overseeing the development of the Regional UFLS program while requiring the Planning Coordinators to participate in the process. The SDT notes that Order 672 establishes that requirements apply to users, owners, and operators of the Bulk Electric System. The SDT thinks that the Planning Coordinator (a user, owner, operator of the Bulk Electric System) is the next most appropriate entity to fulfill the responsibilities in the proposed standard.
3. Some commenters thought that Generator Owner should be included as an applicable entity. This standard has not included requirements for generators since such requirements have been grouped with other generator requirements in PRC-024 which presently is under development. The SDT has coordinated development of this standard with the Generator Verification Standard Drafting Team and will continue to do so to ensure coordination between the UFLS program requirements and the generator requirements.
4. Some commenters thought that the Transmission Planner is the more appropriate applicable entity. The SDT believes the Planning Coordinator is the most appropriate applicable entity because design of a UFLS program should consider the widest possible geographic area. Since the Planning Coordinator must work closely with the Transmission Planners in performance of its role, the SDT anticipates that the Transmission Planners’ expertise will be utilized.
5. Some commenters indicated that Reliability Coordinators should be included in the standard. Reliability Coordinators are not included in this standard because this standard addresses only multi-step automatic relay tripping and load shedding that must be planned and implemented in advance. The SDT believes that Planning Coordinators are the appropriate entities for this function. Manual load shedding is not covered by this standard.
6. Some commenters stated that the Transmission Owner should be removed as an applicable entity because any Transmission Owner with load must be registered as a Distribution Provider. In some regions, Transmission Owners are the entities that implement UFLS even when they have no load. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program. (Also covered under Question 1b.)

Organization	Yes or No	Question 1b Comments:
Northeast Power Coordinating Council	No	We agree that the Planning Coordinator is the correct Functional Model entity based on having a wide-area view and the planning expertise to perform UFLS assessments. However, it is not clear to us whether applicability can be assigned to a group of Planning Coordinators as opposed to individual Planning Coordinators.
<p><b>Response: Thank you for your comment. The SDT has removed the group of Planning Coordinators concept from the standard. The applicability has been changed to individual Planning Coordinators.</b></p>		
Midwest ISO Stakeholders Standards Collaborators	No	We can understand the assignment of certain responsibilities to a Planning Coordinator. However, attempting to force Planning Coordinators to develop groups and then holding the entire group accountable for one another's compliance is unworkable.
<p><b>Response: Thank you for your comment. The SDT has removed the group of Planning Coordinators concept from the standard. The applicability has been changed to individual Planning Coordinators.</b></p>		
SERC UFLS Standards Drafting Team	No	No, because Planning Coordinator(PC) role is implemented differently across the regions. The Transmission Planner(TP) is the most appropriate entity to design the UFLS scheme since the TP has the detailed system knowledge and is generally better positioned to develop the scheme. Also, the Transmission Owner (TO) is the most appropriate entity to be responsible for implementation of the UFLS scheme. The TO generally has a wider area of responsibility, thus ensuring all load would be included in the implementation. This approach would allow the Distribution Providers (DP) to participate if they choose to implement the UFLS scheme providing the most selective load tripping, while at the same time allowing for more efficient aggregation of smaller DPs' load into the overall scheme.
<p><b>Response: The SDT believes the Planning Coordinator is the appropriate applicable entity because design of a UFLS program should consider the widest possible geographic area. Since the Planning Coordinator must work closely with the Transmission Planners in performance of its role, the SDT believes that the Transmission Planners' expertise will be utilized.</b></p> <p><b>The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
Southern Company	No	No, because the Planning Coordinator (PC) role is implemented differently across the regions. The Transmission Planner (TP) is the most appropriate entity to design the UFLS scheme since the TP has the detailed system knowledge and is generally better positioned to develop the scheme. Also, the Transmission Owner (TO) is the most appropriate entity to be responsible for implementation of the UFLS scheme. The TO generally has a wider area of responsibility, thus ensuring all load would be included in the implementation. This approach would allow the

Organization	Yes or No	Question 1b Comments:
		Distribution Providers (DP) to participate if they choose to implement the UFLS scheme providing the most selective load tripping, while at the same time allowing for more efficient aggregation of smaller DPs' load into the overall scheme.
<p><b>Response: The SDT believes the Planning Coordinator is the appropriate applicable entity because design of a UFLS program should consider the widest possible geographic area. Since the Planning Coordinator must work closely with the Transmission Planners in performance of its role the SDT anticipates that the Transmission Planners' expertise will be utilized.</b></p> <p><b>The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
FRCC Standards & Operations Departments	No	Although we agree with the concept of the coordinated effort to design an underfrequency load shedding program, we believe that there is a need to establish an entity with the overall responsibility of coordinating the efforts of the Planning Coordinators. We recommend that the Regional Entity be responsible for overseeing the development of the Regional UFLS program while requiring the Planning Coordinators to participate in the process. Although the provided background material dismisses the idea of expanding the applicability to include the Regional Entity, the precedent has been established by assigning applicability to the Regional Entity in the CIP standards.
<p><b>Response: Unfortunately, though the SDT agrees with the commenter's point on assigning applicability to Regional Entities, Order 672 establishes that requirements apply to users, owners, and operators of the Bulk Electric System. The SDT thinks that the Planning Coordinator (a user, owner, operator of the Bulk Electric System) is the next most appropriate entity to fulfill the responsibilities in the proposed standard.</b></p>		
Florida Municipal Power Agency and Select Members	No	While we agree that the responsibility resides with a regional planning coordinator type of Entity, a group of Planning Coordinators is a somewhat nebulous term and calls into question the enforceability of the standard, and therefore calls into question whether FERC will approve it or not. If the group of Planning Coordinators is noncompliant, who is noncompliant? Who negotiates settlement? Who would pay a potential fine? If one of the Entities does not provide data for the database required in R8, are all of the PCs noncompliant? As with nearly all things, in order to get something done, leadership is necessary, so, although this is certainly a team effort, one Entity ought to be designated to offer that leadership. Why not keep it the Regional Entity? Alternatively, is there sufficient justification to create a new function called the Regional Planning Coordinator? Or to change the definitions of Planning Coordinator, Transmission Planner and Resource Planner to essentially cause Transmission Planners and Resource Planners to focus on more local issues whereas the Planning Coordinator by definition becomes regional (and hence eliminates the need for the term a group of Planning Coordinators?)
<p><b>Response: Thank you for your comment. The SDT acknowledges the legal and compliance difficulties involved in requiring that Planning Coordinators join a group that does not presently exist. The SDT has removed the group of Planning Coordinators concept from the standard. The applicability has been changed to individual Planning Coordinators. Unfortunately, though the SDT agrees with the commenter's point on assigning</b></p>		

Organization	Yes or No	Question 1b Comments:
		<p><b>applicability to Regional Entities, Order 672 establishes that requirements apply to users, owners, and operators of the Bulk Electric System. The SDT thinks that the Planning Coordinator (a user, owner, operator of the Bulk Electric System) is the next most appropriate entity to fulfill the responsibilities in the proposed standard.</b></p>
<p>MRO NERC Standards Review Subcommittee</p>	<p>No</p>	<p>We agree with the assignment of selected responsibilities to the Planning Coordinator (PC) and suggest that the NERC Compliance Registry Criteria be revised to add the Planning Coordinator function and the Regional Entities be directed to register applicable entities to this function. Responsibility for several requirements are assigned to a "group" of Planning Coordinators. However, these groups do not presently exist and are not registered or legal entities. Perhaps a Planning Coordinator Group (PCG) should be added to the Applicability section and the NERC Compliance Registry Criteria be revised to add the PCG function, similar to the Reserve Sharing Group (RSG) function. Then, Regional Entities might be directed to register applicable entities to this function. Establishing PCGs would help PCs clarify how the group's responsibilities for compliance and liabilities would be assigned to each of its members. If a registered PCG function is not established, then drafting team should revise R1 to require all Planning Coordinators in a region to form a joint agreement to cover fulfillment of the subsequent UFLS requirements. See details in response to question 8.</p> <p>Transmission Owners function should be removed because it is unnecessary and redundant with the Distribution Provider function. Per NERC Compliance Registry Criteria Rev. 5.0 (Sections II.b and III.b.2), any Transmission Owner that provides and operates the ?wires? to end-use Load served at transmission voltages must register as a Distribution Provider or transfer the responsibility for applicable UFLS requirements to a registered Distribution Provider by written agreement.</p> <p>However, the TO function should be retained if SDT adopts the suggestion of adding R11 and R12 regarding reactive power devices (in Q8).</p> <p>Generator Owners should be assigned responsibility for coordinating any generator off nominal frequency protection with any applicable UFLS relaying and for providing generator off nominal frequency protection information to the Planning Coordinator. So, the Generator Owner function should be added to the Applicability section. The SDT should coordinate with PRC-024 so that requirements do not overlap.</p>
<p><b>Response: Thank you for your comment. The SDT has removed the group of Planning Coordinators concept from the standard. The applicability has been changed to individual Planning Coordinators. The SDT acknowledges the legal and compliance difficulties involved in requiring that Planning Coordinators join a group that does not presently exist.</b></p> <p><b>In some regions, Transmission Owners are the entities that implement UFLS even when they have no load. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p> <p><b>Regarding the comment on reactive power devices referred to in Question 8 the team directs the commenter to the SDT response under Question 8.</b></p> <p><b>This standard has not included requirements for generators since such requirements have been grouped with other generator requirements in PRC-</b></p>		

Organization	Yes or No	Question 1b Comments:
<p><b>024 which presently is under development. The SDT has coordinated development of this standard with the Generator Verification Standard Drafting Team (GV SDT) and will continue to do so to ensure coordination between the UFLS program requirements and the generator requirements.</b></p>		
<p>Kansas City Power &amp; Light</p>	<p>No</p>	<p>It is unnecessary to designate a Transmission Provider with end-use load. That is a Distribution Provider. Generator Owners should be added since generator data will be required to be provided for modeling purposes.</p>
<p><b>Response: The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p> <p><b>This standard has not included requirements for generators since such requirements have been grouped with other generator requirements in PRC-024 which presently is under development. The SDT has coordinated development of this standard with the Generator Verification Standard Drafting Team (GV SDT) and will continue to do so to ensure coordination between the UFLS program requirements and the generator requirements.</b></p>		
<p>IRC Standards Review Committee</p>	<p>No</p>	<p>We do not agree with the SDT to remove the Regional Entities from being assigned requirements on the basis that: ?? the Regional Entities are not user, owners, or operators of the Bulk Electric System and should not be assigned responsibility for requirements.? There are a number of existing standards, for examples: CIP standards, BAL-002, EOP-004, EOP-007, FAC-013, FAC-012, to name a few, that hold the Regional Entities (Regional Reliability Organizations, as written) responsible for standard requirements. Unless and until an assessment is conducted to conclude that all such requirements can be replaced with an alternative responsible entity(ies), we do not see a problem with the Regional Entities being held responsible for complying with standards.The way the requirements are assigned in this draft standard (each group of Planning Coordinators shall) leaves room for confusion to the industry and debates in the compliance audit process. Unless the Group of PCs is registered as an entity, we are unable to see how the pertinent requirements can be legally enforced. An alternative is to assign these requirements to the Regional Entities, OR, develop a requirement for each PC to have an agreement with its Regional Entity to engage in the design of a UFLS program and coordinate settings with other PCs? programs to achieve consistent application across the region. This way, the requirements can be written to hold Each Planning Coordinator rather than Each group of Planning Coordinators. If this approach is adopted, R1 and R2 could be combined as follows:R1. Each Planning Coordinator shall have an agreement with its Regional Entity to participate with other Planning Coordinators within the region in coordinating the design of an underfrequency load shedding program for consistent application across the region.With this change, R3 may be combined with R1 or be a separate requirement holding each PC responsible for engaging in the development of the criteria.And R3 to R8 can be revised to ?Each Planning Coordinator, in meeting the intent of R1, shall?The proposed changes provide clarity to the PC?s responsibility and removes gray areas in the compliance audit process.</p>
<p><b>Response: The SDT notes that Order 672 establishes that requirements apply to users, owners, and operators of the Bulk Electric System. The SDT thinks that the Planning Coordinator (a user, owner, operator of the Bulk Electric System) is the next most appropriate entity to fulfill the responsibilities in the proposed standard. The SDT acknowledges the legal and compliance difficulties involved in requiring that Planning</b></p>		

Organization	Yes or No	Question 1b Comments:
<p><b>Coordinators join a group that does not presently exist. Accordingly, the SDT has removed the group of Planning Coordinators concept from the standard. The applicability has been changed to individual Planning Coordinators.</b></p>		
<p>Independent Electricity System Operator</p>	<p>No</p>	<p>We do not agree with the SDT to remove the Regional Entities from being assigned requirements on the basis that: ?? the Regional Entities are not user, owners, or operators of the Bulk Electric System and should not be assigned responsibility for requirements. There are a number of existing standards, for examples: CIP standards, BAL-002, EOP-004, EOP-007, FAC-013, FAC-012, to name a few, that hold the Regional Entities (Regional Reliability Organizations, as written) responsible for standard requirements. Unless and until an assessment is conducted to conclude that all such requirements can be replaced with an alternative responsible entity(ies), we do not see a problem with the Regional Entities being held responsible for complying with standards. The way the requirements are assigned in this draft standard (each group of Planning Coordinators shall) leaves room for confusion to the industry and debates in the compliance audit process. Unless the Group of PCs is registered as an entity, we are unable to see how the pertinent requirements can be legally enforced. An alternative is to assign these requirements to the Regional Entities, OR, develop a requirement for each PC to have an agreement with its Regional Entity to engage in the design of a UFLS program and coordinate settings with other PCs programs to achieve consistent application across the region. This way, the requirements can be written to hold Each Planning Coordinator rather than Each group of Planning Coordinators. If this approach is adopted, R1 and R2 could be combined as follows: R1. Each Planning Coordinator shall have an agreement with its Regional Entity to participate with other Planning Coordinators within the region in coordinating the design of an underfrequency load shedding program for consistent application across the region. With this change, R3 may be combined with R1 or be a separate requirement holding each PC responsible for engaging in the development of the criteria. And R3 to R8 can be revised to ?Each Planning Coordinator, in meeting the intent of R1, shall?? The proposed changes provide clarity to the PC?s responsibility and removes gray areas in the compliance audit process.</p>
<p><b>Response: The SDT notes that Order 672 establishes that requirements apply to users, owners, and operators of the Bulk Electric System. The SDT thinks that the Planning Coordinator (a user, owner, operator of the Bulk Electric System) is the next most appropriate entity to fulfill the responsibilities in the proposed standard. The SDT acknowledges the legal and compliance difficulties involved in requiring that Planning Coordinators join a group that does not presently exist. Accordingly, the SDT has removed the group of Planning Coordinators concept from the standard. The applicability has been changed to individual Planning Coordinators.</b></p>		
<p>Central Lincoln</p>	<p>No</p>	<p>"Transmission Owners with end-use Load connected to their Facilities where such end use load is not part of a Distribution Providers load" TOs that meet the registry criteria for DP should be registered as such. If they don't meet the criteria, they are not required to have UFLS and this standard is not applicable to the small unregistered distribution system in question.</p> <p>Instead, I propose that TOs be included with no qualification, or a qualification that expresses the following situation: A DP and a TO may jointly decide the most effective location for UFLS may be on the TO's system, where it may be</p>

Organization	Yes or No	Question 1b Comments:
		easier to reach the load shedding target. It would then be the TO that would be required to meet R9 and R10.
<p><b>Response: The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
Exelon	No	GOs should be included as applicable entities because they play an important role in matching load and generation in periods of frequency excursion. That being said, the standard should not require the installation of under frequency relays at generators that would remain on line beyond these minimum requirements.
<p><b>Response: This standard has not included requirements for generators since such requirements have been grouped with other generator requirements in PRC-024 which presently is under development. The SDT has coordinated development of this standard with the Generator Verification Standard Drafting Team (GV SDT) and will continue to do so to ensure coordination between the UFLS program requirements and the generator requirements.</b></p>		
Arkansas Electric Cooperative Corporation	No	<p>I agree with the Planning Coordinator Group concept but this group should be required to solicit the input from other functional entities such as the GO, TO, TOP, DP, and LSE when developing the criteria and plans. These other entities will have valuable insight as to what should and should not be included in the UFIS programs and need to have a voice during the development of these programs. I would suggest adding the following sentence to R2 and R3 "The design(R2)/criteria(R3) shall be developed taking into consideration the input and feedback from the Generator Owners, Transmission Owners, Transmission Operators, Distribution Providers and Load Serving Entities to which the design/criteria shall apply."</p> <p>While the Distribution Provider may own the equipment the LSE will play a valuable role in determining which equipment should be used to shed load. The LSE and not necessarily the DP has a better knowledge of the load makeup served by the DP's equipment and thus may be in a better position to identify the best location for UF relays. For example the LSE would know if a circuit has a critical load where the DP may or may not have this knowledge. Since load is what is being dropped, the LSE is the best one to make the determination of which load is to be shed. The LSE may not need be an applicable entity but the UF programs and plans should not be developed without their input. It may be that the standard applicability needs to be expanded to these other entities by adding something to the effect of: GO, TO, TOP, DP, and LSE will participate in the development of the UFLS program and plans by providing input and feedback.</p>
<p><b>Response: The commenter is referencing issues that must be addressed to determine "how" the program is to be developed and implemented. The standard states measurable requirements for "what" is to be accomplished. Choice of load to be tripped, for example, is an implementation issue not specified in the standard. Responsible entities are allowed to choose the most appropriate manner in which to implement the program design to achieve the reliability objective of arresting frequency decline. The continent-wide standard also does not preclude the use of the regional standard development process that may involve these other entities to produce a regional standard. Note that the SDT has removed the group of Planning</b></p>		

Organization	Yes or No	Question 1b Comments:
<p><b>Coordinators concept from the standard. The applicability has been changed to individual Planning Coordinators.</b></p>		
<p>Duke Energy</p>	<p>No</p>	<p>The proposed standard’s requirements R1-R8 are applicable to Planning Coordinator, which isn’t a registered function in NERC’s compliance registry. Without applicability to a registered entity such as the Planning Authority or Transmission Planner, there is no clear responsibility for compliance.</p> <p>Also it is unclear how compliance can reasonably be enforced when responsibility is shared by a group of entities. It is not clear how non-compliance with R6 is addressed given that all PCs in the region are combined by R1. Somehow, each PC must be allowed to demonstrate compliance to the standard independently so compliant PCs are not penalized along with the non-compliant one(s).</p>
<p><b>Response: NERC has submitted and FERC has accepted a statement that the previously defined term of Planning Authority is the same entity/function as the currently approved Functional Model term Planning Coordinator. Based on the "Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking for Facilities Design, Connections and Maintenance Reliability Standards", Docket No. RM07-3-000, dated September 19th, 2007, pages 15 and 16, NERC states: “While NERC recognizes there will be a need to modify the compliance registration process to include the planning coordinator, in the future, on an interim basis, any requirement assigned to the planning authority is assumed also to apply to the planning coordinator. Because no approved standards apply to the “planning coordinator at this time, the modification to the NERC Compliance Registry is not a current issue.” This document can be found at: <a href="http://www.nerc.com/docs/docs/ferc/FinalFAC.pdf">http://www.nerc.com/docs/docs/ferc/FinalFAC.pdf</a>. Based on this document, the SDT feels the Planning Coordinator is the correct entity.</b></p> <p><b>In addition, the current NERC Glossary of terms indicates that the Planning Authority and Planning Coordinators are the same.</b></p> <p><b>The SDT has removed the group of Planning Coordinators concept from the standard. The applicability has been changed to individual Planning Coordinators.</b></p>		
<p>ReliabilityFirst</p>	<p>No</p>	<p>The Transmission Owner with end use load connected ... is out of line with the NERC Functional Model knowing that if a Transmission Owner has end use load connected, by definition, the Transmission Owner must register as a Distribution Provider. Therefore, using just the Distribution Provider in the UFLS standard is adequate and complete.</p>
<p><b>Response: In some regions, Transmission Owners are the entities that implement UFLS even when they have no load. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
<p>Hydro-Québec TransEnergie (HQT)</p>	<p>No</p>	<p>HQT agree that the Planning Coordinator is the correct Functional Model entity based on having a wide-area view and the planning expertise to perform UFLS assessments. However, it is not clear whether applicability can be assigned to a group of Planning Coordinators as opposed to individual Planning Coordinator.</p>
<p><b>Response: Thank you for your comment. The SDT has removed the group of Planning Coordinators concept from the standard. The applicability</b></p>		

Organization	Yes or No	Question 1b Comments:
<b>has been changed to individual Planning Coordinators.</b>		
AEP	No	Reliability Coordinators have set up specific standards on the set points for UFLS. The proposed standard misses this circumstance by not including the Reliability Coordinator in the standard. How would this be reconciled?
<b>Response: Reliability Coordinators are not included in this standard because this standard addresses only multi-step automatic relay tripping and load shedding that must be planned and implemented in advance. The SDT believes that Planning Coordinators are the appropriate entities for this function. Manual load shedding is not covered by this standard.</b>		
We Energies	No	See our question 8 comments for more detail.
<b>Response: See response to Question 8 comments.</b>		
American Transmission Company	No	<p>We agree with the assignment of selected responsibilities to the Planning Coordinator (PC) and suggest that NERC revise the Compliance Registry Criteria to add the Planning Coordinator and direct the Regional Entities to register applicable entities to this function.</p> <p>Responsibility for several requirements are assigned to a "group" of Planning Coordinators, but Planning Coordinator Group (PCG) does not appear in the list of applicable entities. We agree with leaving the PCG entity off of the list. However, without a PCG entity in the list, the applicable requirements should be reworded to make each Planning Coordinator individually responsible for their contribution to the group actions. Suggested wording for each applicable requirement is provided in the response to Question 8. If the drafting team decides to apply requirement responsibilities to a PCG, then NERC should revise the Compliance Registry Criteria to add the PCG and direct the Regional Entities to register the applicable entities to this function. Since regional PCGs have not been formed as legal entities in the past, then going this direction would require PC to establish contracts to form these groups in order to clearly define the compliance and sanction liabilities of each PC in the group.</p> <p>Transmission Owners should be removed because it is redundant with Distribution Provider. Per NERC Compliance Registry Criteria Rev. 5.0 (Sections II.b and III.b.2), any Transmission Owner that provides and operates the wires to end-use Load served at transmission voltages must register as a Distribution Provider or transferred the responsibility for applicable UFLS requirements to a registered Distribution Provider by written agreement. Therefore, we suggest the removal of Transmission Owner from the Applicability section.</p> <p>Generator Owners (GO) should be included in the Applicable entities section and requirements should be added that assign GOs the responsibility for providing generator off nominal frequency protection information to the Planning Coordinator and for coordinating any generator off nominal frequency protection with any applicable UFLS program.</p>
<b>Response: Thank you for your comment. The SDT has removed the group of Planning Coordinators concept from the standard. The applicability</b>		

Organization	Yes or No	Question 1b Comments:
<p>has been changed to individual Planning Coordinators.</p> <p>In some regions, Transmission Owners are the entities that implement UFLS even when they have no load. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</p> <p>This standard has not included requirements for Generator Owners since such requirements have been grouped with other generator requirements in PRC-024 which presently is under development. The SDT has coordinated development of this standard with the Generator Verification Standard Drafting Team (GV SDT) and will continue to do so to ensure coordination between the UFLS program requirements and the generator requirements.</p>		
Ameren	No	<p>It seems that the Transmission Planner would be a better choice than the Planning Coordinator for the design of the UFLS programs. The Transmission Planner is more knowledgeable about the how the load and generation interact and how best to model these impacts on the frequency.</p>
<p><b>Response: The SDT believes the Planning Coordinator is the appropriate applicable entity because design of an UFLS program should consider the widest possible geographic area. Since the Planning Coordinator must work closely with the Transmission Planners in performance of its role, the SDT believes that the Transmission Planners' expertise will be utilized.</b></p>		
FirstEnergy Corp	No	<p>We support the removal of the Transmission Owner with end-use Load connected to their Facilities. The Distribution Provider entity adequately covers all load that is subject to this standard.</p> <p>The Generator Owner should be added to better coordinate their frequency protection with UFLS.</p>
<p><b>Response: In some regions, Transmission Owners are the entities that implement UFLS even when they have no load. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p> <p><b>This standard has not included requirements for Generator Owners since such requirements have been grouped with other generator requirements in PRC-024 which presently is under development. The SDT has coordinated development of this standard with the Generator Verification Standard Drafting Team (GV SDT) and will continue to do so to ensure coordination between the UFLS program requirements and the generator requirements.</b></p>		
Xcel Energy	No	<p>We feel 4.3 should be removed.</p> <p>Additionally, we feel that the informal formation of a group for the Planning Coordinators in non-RTO areas is problematic. We feel a new registered entity should be created, perhaps called the Planning Coordinator Group. This group would develop a governing document that spells out roles, responsibilities, etc. like a Reserve Sharing Group does. We feel this approach would best resolve issues surrounding coordination, compliance audits, entity identification in situations of potential non-compliance, penalty assessment, etc. The individual Planning Coordinators would still be required to join a group in their region, per R1. But, the remainder of the requirements should only refer</p>

Organization	Yes or No	Question 1b Comments:
		to the Planning Coordinator Group. If the Regional Entity is not going to play a role in coordinating the Planning Coordinators, then we are unsure how an entity would join a group or attach itself to a group. We feel that in non-RTO areas, the Regional Entity should at least serve as a single point of contact for all Planning Coordinators in that region.
<p><b>Response: In some regions, Transmission Owners are the entities that implement UFLS even when they have no load. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p> <p><b>The SDT has removed the group of Planning Coordinators concept from the standard. The applicability has been changed to individual Planning Coordinators. The SDT acknowledges the legal and compliance difficulties involved in requiring that Planning Coordinators join a group that does not presently exist.</b></p>		
TRE UFLS Standard Drafting Team	Yes	The TRE UFLS SDT believes specifically that data collection and assessments are most effectively carried out at the regional level. However, it is important to note one issue that will have to be dealt with in the regional standard and/or programs is how to account for the small load-serving systems (e.g., less than 25 MW) that are not NERC-registered.
<p><b>Response: The SDT agrees with the commenter and offers the following observations. Notes 1 and 4 of the NERC Compliance Registry state in part that “The above are general criteria only. The Regional Entity considering registration of an organization not meeting (e.g., smaller in size than) the criteria may propose registration of that organization if the Regional Entity believes and can reasonably demonstrate that the organization is a bulk power system owner, or operates, or uses bulk power system assets, and is material to the reliability of the bulk power system.” And that “If an entity is part of a class of entities excluded based on the criteria above as individually being unlikely to have a material impact on the reliability of the bulk power system, but that in aggregate have been demonstrated to have such an impact it may be registered for applicable standards and requirements irrespective of other considerations.” The SDT has already received initial feedback from both NERC and FERC staffs that such a condition may exist for implementation of this standard since the effectiveness of an overall UFLS program must consider the entire load. The development of any UFLS program must include some means of providing a mutual/coordinated load shed for “smaller” entities such as agreements by “larger” entities to provide such load shedding.</b></p>		
Bonneville Power Administration	Yes	BPA will have to have delegation agreements with DP’s when BPA is covering their loads with BPA-UFLS relays or through other UFLS armed load in our BAA.
<p><b>Response: The SDT agrees that the approach the commenter is suggesting is one appropriate way to address the needs, and thanks the commenter for their support.</b></p>		
ERCOT ISO	Yes	ERCOT ISO believes the Planning Coordinator is the correct responsible entity.
<p><b>Response: Thank you for your support.</b></p>		

Organization	Yes or No	Question 1b Comments:
	Yes	I would defer to the opinion of the Planning Coordinators, but am wondering why the RC is not involved. As far as the TO and DP responsibility I see no problem as long as it is clear what data and load tripping is required.
<p><b>Response: Reliability Coordinators are not included in this standard because this standard addresses only multi-step automatic relay tripping and load shedding that must be planned and implemented in advance. The SDT believes that Planning Coordinators are the appropriate entities for this function. Manual load shedding is not covered by this standard.</b></p>		
PacifiCorp	Yes	<p>While PacifiCorp agrees that coordination between Planning Coordinators is necessary in order to design and implement an effective UFLS program, it has some concern regarding the assignment of responsibility for compliance with this standard to a currently undefined group of Planning Coordinators. There is no such entity in the Functional Model and it is therefore unclear as to how this group will function and by whom it will be governed. The way the standard is currently drafted raises significant questions regarding how the requirements will be enforced, how a Planning Coordinator will know what group to participate in, how its participation in such group will be evaluated, how disagreements between group participants will be resolved, and which entity, among such group of Planning Coordinators, will be responsible for any potential violations. PacifiCorp recommends that either 1) the SDT assign the UFLS coordination responsibility and governance to the Regional Entity; or 2) the SDT re-draft the standard in such a way that allows Planning Coordinators to assign their compliance responsibility and activity to an agent Planning Coordinator Group similar to the group concept utilized in BAL-002-0 that allows Balancing Authorities to assign compliance responsibility to a Reserve Sharing Group.</p>
<p><b>Response: Thank you for your comment. The SDT has removed the group of Planning Coordinators concept from the standard. The applicability has been changed to individual Planning Coordinators.</b></p>		
NIPSCO	Yes	The planning groups yes
<p><b>Response: Thank you for your support.</b></p>		
Pepco Holdings, Inc – Affiliates	Yes	
Electric Market Policy	Yes	
Edward C. Stein	Yes	
Colmac Clarion	Yes	

**Consideration of Comments on Underfrequency Load Shedding Program Requirements — Project 2007-01**

Organization	Yes or No	Question 1b Comments:
City of Bedford	Yes	
Alabama Municipal Electric Authority	Yes	
US Army Corps of Engineers	Yes	
Public Service Electric and Gas Company	Yes	
SPP System Protection and Control Working Group	Yes	
Long island power Authority	Yes	
ReliabilityFirst Corporation	Yes	
System Protection & Control	Yes	
Ontario Power Generation	Yes	
Luminant Power	Yes	
NextEra Energy Resources, LLC		No comment.

2. The SDT has strived to draft the applicability in a manner that includes all load while avoiding assigning applicability to more than one entity for the same load. The Functional Model indicates the Distribution Provider is not defined by a specific voltage, but rather as performing the Distribution function at any voltage. Considering the Functional Model definition of Distribution Providers please indicate whether you believe it is necessary to assign applicability to "Transmission Owners with end-use Load connected to their Facilities where such end-use load is not part of a Distribution Provider's load".

**Summary Consideration:** Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.

Organization	Yes or No	Question 2 Comments:
Northeast Power Coordinating Council	No	Based on the definition of Distribution Provider in the Functional Model we believe that the applicability should be limited to Distribution Providers. All load should be accounted for by a registered Distribution Provider. The standard should not be written to correct for deficiencies resulting from incorrect registration of entities, and proper registration is vital to the reliability of the UFLS program.
<p><b>Response:</b> Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</p>		
Southern Company	No	The applicability should be assigned to the TO only (not to DP). The Transmission Owner (TO) is the most appropriate entity to be responsible for implementation of the UFLS scheme. The TO generally has a wider area of responsibility, thus ensuring all load would be included in the implementation. This approach would allow the Distribution Providers (DP) to participate, if they choose, to implement the UFLS scheme providing the most selective load tripping, while at the same time, allowing for more efficient aggregation of smaller DPs' load into the overall scheme.

Organization	Yes or No	Question 2 Comments:
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
Electric Market Policy	No	The definition of Distribution Provider is adequate.
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
Midwest ISO Stakeholders Standards Collaborators	No	<p>We do not believe it is necessary to assign applicability to Transmission Owners with end-use Load connected to their Facilities where such end-use load is not part of the Distribution Providers load. We believe this clause is describing a distribution provider and these TOs should be registered as DPs.</p> <p>Furthermore, Standards should not attempt to create new classifications of registered entities. This is the function of the compliance registration process.</p>
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
SERC UFLS Standards Drafting Team	No	<p>The applicability should be assigned to the TO only (not to DP). The Transmission Owner (TO) is the most appropriate entity to be responsible for implementation of the UFLS scheme. The TO generally has a wider area of responsibility, thus ensuring all load would be included in the implementation. This approach would allow the Distribution Providers (DP) to participate if they choose to implement the UFLS scheme providing the most selective load tripping, while at the same time allowing for more efficient aggregation of smaller DPs' load into the overall scheme.</p>

Organization	Yes or No	Question 2 Comments:
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
MRO NERC Standards Review Subcommittee	No	<p>The MRO NSRS believes that the definition of Distribution Provider assures that there are no gaps or holes in coverage of the applicable load. As noted in the response to Question 1, it is unnecessary to also assign applicability to Transmission Owners with end-use Load connected to their Facilities because according to the NERC Compliance Registry Criteria Rev 5.0 (Sections II.b and III.b.2) these entities must register as a Distribution Provider or transfer the responsibility for applicable UFLS requirements to a registered Distribution Provider by written agreement.</p>
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
Kansas City Power & Light	No	<p>No, it is not necessary to include Transmission Provider with end-use load.</p>
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
IRC Standards Review Committee	No	<p>NERC standards and requirements should not attempt to further define the functional entities. For those transmission owners that have facilities that meet the NERC definition of Distribution Provider, they should be registered in the compliance registry as such. If the interpretation of the current definition is that it does not include Transmission Owners with end-use Load connected to their facilities, we recommend the definition of Distribution Provider be updated. The Functional Model does not preclude assigning this responsibility to the Transmission Owners with end-use Load connected to their facilities where such end-use load is not part of a Distribution Provider's load. Excerpt</p>

Organization	Yes or No	Question 2 Comments:
		<p>from Chapter 14 of the Version 4 Functional Model Technical Document, below, describes this process:[When a Transmission Operator sees a need for non-voluntary load curtailment to relieve transmission constraints, such as an actual or expected exceedance of an operating limit, it implements load shedding that is under its control, or directs a Distribution Provider to physically implement the curtailment.]Loads that are connected to the transmission facilities and where such loads are not part of the DP’s loads can and should be curtailed by the TOP action (to relieve constraints) or by the UFLS relays provided by the TOs (to arrest frequency decline).If the SDT is still undecided on this issue, we suggest the SDT consult the FMWG</p>
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
Public Service Electric and Gas Company	No	The Distribution Provider can in most cases identify all the load that is included in the UFLS Program.
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
Central Lincoln	No	But please see Q1b comments.
<p><b>Response: Please see the response to Q1b comments.</b></p>		
SPP System Protection and Control Working Group	No	For those transmission owners that have facilities that meet the NERC definition of Distribution Provider, they should be registered in the compliance registry as such.
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance</b></p>		

Organization	Yes or No	Question 2 Comments:
<p><b>Registry Guidelines.</b> However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</p>		
Long island power Authority	No	
ReliabilityFirst	No	<p>The Transmision Owner with end use load connected ... is out of line with the NERC Functional Model knowing that if a Transmision Owner has end use load connected, by definition, the Transmision Owner must register as a Distribution Provider. Therefore, using just the Distribution Provider in the UFLS standard is adequate and complete.</p>
<p><b>Response:</b> Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</p>		
Illinois Municipal Electric Agency	No	<p>IMEA believes it is not necessary to assign applicability to the TO function since the NERC Statement of Compliance Registry Criteria (Revision 5.0) already specifies that for end-use customers who are served at transmission voltages, the TO also serves as the DP (i.e., such a TO should already be registered as a DP).</p>
<p><b>Response:</b> Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</p>		
American Transmission Company	No	<p>As noted in the response to Question 1, per NERC Compliance Registry Criteria Rev. 5.0 (Sections II.b and III.b.2), any Transmission Owner with end-use load connected to their facilities must register as a Distribution Provider or transferred the responsibility for applicable UFLS requirements to a registered Distribution Provider by written agreement. So, all applicable end-use load will be covered by the standard and the assignment of applicability to Transmission Owners with end-use load connected to their facilities is superflous and redundant.</p>
<p><b>Response:</b> Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers</p>		

Organization	Yes or No	Question 2 Comments:
<p>and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</p>		
<p>Hydro-Québec TransEnergie (HQT)</p>	<p>No</p>	<p>Based on the definition of Distribution Provider in the Functional Model we believe that the applicability should be limited to Distribution Providers. All load should be accounted for by a registered Distribution Provider. The standard should not be written to correct for deficiencies resulting from incorrect registration of entities, and proper registration is vital to the reliability of the UFLS program.</p>
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
<p>FirstEnergy Corp</p>	<p>No</p>	<p>The Distribution Provider sufficiently covers the end-use load subject to UFLS requirements and we do not believe the Transmission Owner needs to be included within the applicability of this standard.</p>
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
<p>CenterPoint Energy</p>	<p>No</p>	<p>For many years, CenterPoint Energy has complied with regional UFLS criteria for distribution load tripping. CenterPoint Energy does not believe it is necessary to include any requirements within PRC-006 for applicability to Transmission Owners and, therefore, recommends deleting Transmission Owner from Requirements 9 and 10. CenterPoint Energy commends the SDT for addressing the difficult issue of Applicability. By definition, Transmission Owners do not serve any load, whether distribution voltage or end-use transmission voltage. There may also be legalities that can preclude a Transmission Owner from serving any load. It would be problematic for a Transmission Owner to determine what transmission end-use load to trip when such loads can be refineries, chemical plants, water plants, and national space agency facilities. Tripping of such loads may have environmental and safety impacts. In addition, a Transmission Owner may not have any ownership of a transmission voltage end-use facility, nor control</p>

Organization	Yes or No	Question 2 Comments:
		over such a facility. CenterPoint Energy believes the NERC Functional Model correctly reflects that Distribution Providers, not Transmission Owners, would be the responsible entity for load tripping.
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
Xcel Energy	No	We feel 4.3 should be removed.
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
We Energies	No	
TRE UFLS Standard Drafting Team	Yes	The TRE UFLS SDT believes the applicable entities provided for in the proposed standard are appropriate. However, the TRE UFLS SDT believes that the only group that may not be clearly understood to have assigned applicability are self-served customers that can shut down generation and pull from the grid without activating their own underfrequency load shedding. Assigning applicability to Transmission Owners with end-use load may make this clearer but we are not sure it is clear enough for self-served industrials. Additional specific wording to address this may be needed.
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p> <p><b>However, the SDT does not believe that including Transmission Owners in the Applicability clarifies responsibilities for self-served customers. The SDT believes that, from a NERC Reliability Standard perspective, such customers must be addressed and included in an effective UFLS program.</b></p>		

Organization	Yes or No	Question 2 Comments:
<p>The SDT is unaware of any provision for such customers to be exempt from functional registration by the Regional Entity. With regard to coordination of generation tripping by frequency level or with regard to load tripping by frequency level, such installations are equally important with regard to their potential impact upon the reliability of the bulk power system.</p>		
<p>Pepco Holdings, Inc - Affiliates</p>	<p>Yes</p>	<p>PHI agrees that including the Transmission Owners with end-use Load connected to their Facilities where such end use load is not part of a Distribution Provider's load eliminates the ambiguity that could result if Transmission Owners were not included in the Applicability list.</p>
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
<p>Bonneville Power Administration</p>	<p>Yes</p>	<p>It addresses DSI and other large loads that are directly connected to the BES.</p>
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
<p>ERCOT ISO</p>	<p>Yes</p>	<p>All loads within the region should be accounted for when designing an UFLS program.</p>
<p><b>Response: The SDT agrees and intends that all load be covered. Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
<p>FRCC Standards &amp; Operations</p>	<p>Yes</p>	<p>We believe that it is necessary to assign applicability to 'Load Serving Entities'. The Compliance Registry Criteria states: Load-serving entity is designated as the responsible entity for facilities that are part of a required</p>

Organization	Yes or No	Question 2 Comments:
Departments		<p>underfrequency load shedding (UFLS) program designed, installed, and operated for the protection of the bulk power system. Therefore their applicability is appropriate. In addition we recommend adding a caveat within the applicability section that reads</p> <p>The TO, LSE or DP may meet these requirements through participation in an aggregated UFLS Program as permitted by the Regional UFLS program. This would allow smaller systems to aggregate load requirements and more effectively meet Regional UFLS requirements.</p> <p>Furthermore, we recommend an additional caveat within the applicability section that reads, "Compliance with an approved Regional Reliability Standard which defines the requirements of the Regional UFLS program satisfies the compliance requirements associated with this continent wide standard." This assumption can be made based on the defined attributes of a Regional Reliability Standard (i. e. Regional Reliability Standards go beyond, add detail to, or implement NERC Reliability Standards. Regional Reliability Standards shall not be inconsistent with or less stringent than NERC Reliability Standards.).</p>
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program. The interim changes to the NERC Statement of Compliance Registry were made to reflect concerns about the definition of the LSE as a “facility owning entity” as opposed to the Distribution Provider. As demonstrated in the NERC LSE workshop, currently approved Functional Model and the interim Registry Criteria changes, for standards purposes the DP is the “wires” connection to the electric system and owner of the UFLS tripping equipment. This may be inconsistent with previous usage of the same terms in some parts of the country. The Version 0 applicability for UFLS was set prior to the Registry and determined on the then general understanding of the Functional Model and industry usage. The current Functional Model is much clearer on this issue and designates the DP as the facility owner. Since NERC has stated that the Registry Criteria now has an interim step to correct the issue, it is expected that the Registry Criteria will change as the standards are re-evaluated for appropriateness. The SDT believes that this standard is in line with the direction taken by the interim changes and the approved Functional Model.</b></p> <p><b>The applicability of one standard does not reference another; each standard when approved by FERC or other governmental authorities stands on its own merit. The development of a continent wide standard does not prohibit the development of a regional standard. It is up to the region to decide whether a regional standard can be justified or if a regional variance is appropriate.</b></p>		
Florida Municipal Power Agency and Select Members	Yes	<p>Yes, we agree, but, want to be sure the implications are understood. As written, it would seem that the proposed language would make Transmission Owners responsible for adding up the load connected to their system, and if the total load scheduled to trip by UFLS does not meet the percentage of total load connected to that TO required, then, the TO would seem to be the ones responsible for making up the difference. We have to call into question whether</p>

Organization	Yes or No	Question 2 Comments:
		<p>capturing all of the load is worth the effort and whether it truly makes a significant difference to the reliability of the Bulk Electric System. We would suggest the added flexibility of including Load Serving Entities (LSEs) to the applicability section as well as including the ability for LSEs to represent multiple Distribution Providers. The Compliance Registry Criteria states: Load-serving entity is designated as the responsible entity for facilities that are part of a required underfrequency load shedding (UFLS) program designed, installed, and operated for the protection of the bulk power system. Therefore their applicability is appropriate. In addition we recommend adding the ability to aggregate within the applicability section that reads The LSE or DP may meet these requirements through participation in an aggregated UFLS Program. This would allow small systems to aggregate load requirements and more effectively meet Regional UFLS forecast load tripping requirements. The aggregation provides better resolution to the Regional plan requirements. Or alternatively, create a new function that allows aggregation similar to a Reserve Sharing Group.</p>
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program. The interim changes to the NERC Statement of Compliance Registry were made to reflect concerns about the definition of the LSE as a “facility owning entity” as opposed to the Distribution Provider. As demonstrated in the NERC LSE workshop, currently approved Functional Model and the interim Registry Criteria changes, for standards purposes the DP is the “wires” connection to the electric system and owner of the UFLS tripping equipment. This may be inconsistent with previous usage of the same terms in some parts of the country. The Version 0 applicability for UFLS was set prior to the Registry and determined on general understanding of the Functional Model and industry usage. The current Functional Model is much clearer on this issue and designates the DP as the facility owner. Since NERC has stated that the Registry Criteria now has an interim step to correct the issue. It is expected that the Registry Criteria will change as the standards are re-evaluated for appropriateness. The SDT believes that this standard is in line with the direction taken by the interim changes and the approved Functional Model.</b></p>		
Cowlitz County PUD	Yes	<p>Yes, but for a different reason: many times the TO will be the owner of the UFLS equipment (e.g. Bonneville Power Administration), not the DP. There are many DP's who do not own UFLS equipment and should not be forced in this position if there is a willing TO to take on the responsibility.</p>
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program. The Statement of Compliance Registry Criteria can permit small</b></p>		

Organization	Yes or No	Question 2 Comments:
<b>Distribution Provider exemption from registration and therefore exclusion from implementing UFLS apart from the applicability of this standard.</b>		
Exelon	Yes	Need to verify all end use load participates regardless of supply voltage level.
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
AEP	Yes	This is a useful method for identifying those TOs where this situation occurs, instead of making the standard unnecessarily apply to all TOs.
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
PacifiCorp	Yes	The simulations done by a group of Planning Coordinators must include all load in designing the UFLS program. However, there should be no obligation that all entities be required to shed any of their load at any particular frequency as long as sufficient load is shed in the area under study. The UFLS program could exempt Distribution Providers with peak loads less than an agreed upon threshold from shedding any load as long as sufficient load is shed in the area under study.
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program. The Statement of Compliance Registry Criteria can permit small Distribution Provider exemption from registration and therefore exclusion from implementing UFLS apart from the applicability of this standard.</b></p>		
Ameren	Yes	There may be loads that have no association or relationship with a Distribution Provider that would allow their load to

Organization	Yes or No	Question 2 Comments:
		be interrupted and thus be considered for the UFLS program.
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program. The SDT assumes that the loads the commenter refers to are served by Transmission Owners.</b></p>		
Independent Electricity System Operator	Yes	<p>We agree that it is necessary to assign applicability to Transmission Owners with end-use Load connected to their facilities where such end-use load is not part of a Distribution Providers load. This assignment is in principle consistent with the perceived process presented in the Functional Model pertaining to the Transmission Operator having a role to curtail loads that are under its control to relieve transmission constraint. Excerpt from Chapter 14 of the Version 4 Functional Model Technical Document, below, describes this process:[When a Transmission Operator sees a need for non-voluntary load curtailment to relieve transmission constraints, such as an actual or expected exceedence of an operating limit, it implements load shedding that is under its control, or directs a Distribution Provider to physically implement the curtailment.]Loads that are connected to the transmission facilities and where such loads are not part of the DPs loads can and should be curtailed by the TOP action (to relieve constraints) or by the UFLS relays provided by the TOs (to arrest frequency decline).</p>
<p><b>Response: Industry comments suggest the entity that presently implements UFLS varies among regions and includes both Distribution Providers and Transmission Owners. The SDT believes that the Distribution Provider, as the entity that connects end-user load to the electrical system, has primary responsibility for implementing UFLS. This is confirmed by the Functional Model and the interim changes made to the NERC Compliance Registry Guidelines. However, the SDT also recognizes that many Transmission Owners provide implementation of UFLS under agreement with a Distribution Provider. The SDT has revised the applicability to include both Distribution Providers and Transmission Owners as UFLS entities that may be designated by Planning Coordinators to implement a UFLS program.</b></p>		
Colmac Clarion	Yes	
City of Bedford	Yes	
Alabama Municipal Electric Authority	Yes	
US Army Corps of	Yes	

**Consideration of Comments on Underfrequency Load Shedding Program Requirements — Project 2007-01**

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Organization	Yes or No	Question 2 Comments:
Engineers		
NIPSCO	Yes	
ReliabilityFirst Corporation	Yes	
Arkansas Electric Cooperative Corporation	Yes	
System Protection & Control	Yes	
Ontario Power Generation	Yes	
Luminant Power	Yes	
NextEra Energy Resources, LLC		No comment.

3. The proposed continent-wide standard requires that Planning Coordinators model the trip settings of any generators that trip at or above 58.0 Hz (Requirement R8) when verifying through dynamic simulation that the UFLS program design is adequate to meet the continent-wide performance characteristics specified in Requirement R6.

Do you agree with this approach to ensure that effectiveness of the UFLS program is not jeopardized by units that trip at or above the minimum frequency (58.0 Hz) at which the UFLS program may arrest frequency decline?

**Summary Consideration:** Most commenters agree that modeling trip settings of generating units is an acceptable approach to ensure that effectiveness of the UFLS program is not jeopardized by units that trip at or above the frequency at which the UFLS program is designed to arrest frequency decline. Some commenters suggested that determining the units to model based only on a frequency threshold would include units unnecessarily. In response to some comments and further SDT deliberations, the standard has been modified to specify, for assessment modeling purposes, generator tripping boundaries as proposed in PRC-024-1, Attachment 1, for which the 58.0 Hz threshold was originally meant as a proxy. Temporary frequency excursions below the UFLS program set points and time delays could occur and the SDT wants to be sure that the assessments do not overlook any generator trip settings just below UFLS set points or just beyond the UFLS relay time delay settings that may still be reached. The standard has been modified to require, in the assessments per R4, the modeling of generator trip settings according to curves as shown in Attachments 1 and 2. These curves are the same as the proposed curves in PRC-024-1, Attachment 1.

Some commenters expressed concern regarding Planning Coordinators maintaining data on generators with trip settings that do not meet the requirements proposed in PRC-024. The SDT notes that per R5 of the first draft of PRC-024-1, the Planning Coordinators will have information on generator under- and over-frequency trip settings that fall outside the acceptable boundaries defined by PRC-024-1, Attachment 1 and may include this information in their database. The SDT agrees with commenters that the Generator Owner is already required by draft PRC-024-1 to supply this information to the Planning Coordinator and has removed this requirement from the draft standard.

Organization	Yes or No	Question 3 Comments:
SPP System Protection and Control Working Group	No	What is the basis for 58.0 Hz? If the region's lowest UFLS setting is designed for 58.7 Hz, is 58.0 Hz requirement critical from the Regional UFLS program point of view?
<p><b>Response:</b> The SDT chose 58.0 Hz as the minimum frequency to observe for purposes of designing a regional UFLS program. This value also coordinates with the under-frequency generator trip curve in PRC-024-1 currently under draft. If a region's lowest UFLS stage is 58.7 Hz, then 58.0 Hz may not be critical. However, it is possible that temporary frequency excursions below the UFLS program set points and time delays could occur and the SDT wants to be sure that the assessments do not overlook any generator trip settings just below UFLS set points or beyond the UFLS relay</p>		

Organization	Yes or No	Question 3 Comments:
<p><b>settings that may still be reached. Note that the standard has been modified to require, in the UFLS assessments per R4, the modeling of generator trip settings according to curves as shown in Attachments 1 and 2. These curves are the same as the proposed curves in PRC-024-1, Attachment 1.</b></p>		
<p>MRO NERC Standards Review Subcommittee</p>	<p>No</p>	<p>[This question actually applies to Requirement R7, not R8.]We agree that PCs should model the trip settings of any generators that may be tripped during the simulated operation of the UFLS program. However, the applicable generator trip settings may vary depending on the set points and time delays of the underfrequency relays of the UFLS program for a given island. We suggest that R7.1 be reworded to "that trip at or above the minimum frequency set points and time delays of the applicable island's UFLS program". This approach gives consideration to the time delay aspect and allows the frequency limit to be higher (or lower), if it is permitted by the applicable island's UFLS program. We suggest similar rewording for R7.2, "that trip at or above the maximum frequency set points and time delays of the applicable island's UFLS program". On a related matter, the existing Requirement R7 states "conduct a UFLS assessment . . . through dynamic simulations". Therefore, we suggest that the following rewording for R7, "shall conduct a UFLS assessment . . . that determines whether the UFLS program design meets . . . R6. The assessment shall include: " This would allow other analytical methods, such as the Equivalent Inertia Analysis, to be used to perform an appropriate UFLS assessment. The Equivalent Inertia method can also be used to check for proper coordination between the underfrequency relay settings and the generator trip settings. R7.1 "Analysis of the trip settings of any generators that . . ." R7.2 "Analysis of the trip settings of any generators that . . ." R7.3 "Analysis of any automatic load restoration that . . ." See response to comment 8 regarding the 58 Hz limit.</p>
<p><b>Response: The SDT apologizes for the incorrect reference to R8. The SDT agrees with your principle and has modified the standard to be more specific on what generator trip settings must be modeled. Temporary frequency excursions below the UFLS program set points and time delays could occur and the SDT wants to be sure that the assessments do not overlook any generator trip settings just below UFLS set points or just beyond the UFLS relay time delay settings that may still be reached. The standard has been modified to require, in the UFLS assessments per R4, the modeling of generator trip settings according to curves as shown in Attachments 1 and 2. These curves are the same as the proposed curves in PRC-024-1, Attachment 1. Nothing in the standard precludes the use of Equivalent Inertia Analysis in the UFLS design process, but the SDT believes that dynamic simulations are the most dependable means of assessing compliance to the performance characteristics. Equivalent inertia analysis would not include the effects of island initiating disturbances on localized frequency and voltage, inter-machine oscillations, or the particular response of individual unit governors.</b></p>		
<p>Kansas City Power &amp; Light</p>	<p>No</p>	<p>This question is actually referring to requirement R6. What is the engineering basis for 58Hz? The frequency threshold should be based on the prevention of damage to generating equipment, operating equipment, customer loads, etc. Regardless of frequency threshold, all generator protection settings that involve frequency and voltage should be modeled in the simulation studies for UFLS programs.</p>
<p><b>Response: The SDT apologizes for the incorrect reference to R8. The engineering basis is coordination of UFLS programs with generator tripping. R6 (now R3) establishes UFLS program requirements that coordinate with the acceptable generator tripping boundary defined by PRC-024-1, Attachment 1. Assessments of UFLS program designs are required to model generator trip settings that fall outside the acceptable boundary</b></p>		

Organization	Yes or No	Question 3 Comments:
<p>specified in PRC-024-1. Note that the standard has now been modified to define curves above and below which generator underfrequency and overfrequency protection, respectively, must be modeled. These curves are the same as the proposed curves in PRC-024-1, Attachment 1. Please see R4 and Attachments 1 and 2. The SDT disagrees that it is necessary to require in this standard that protection settings involving voltage need to be modeled in UFLS assessments, though that may be advisable when simulating islanding scenarios resulting from severe disturbances.</p>		
Colmac Clarion	No	<p>Some U/F setpoints currently in use above 58.0 Hz were mandated by Generator OEM vice Transmission Operator. All U/F setpoint 'mandates' should be made not to violate design setpoints for specific generators OEM requirements when conducting analysis of setpoints.</p>
<p><b>Response:</b> The proposed standard does not preclude settings above 58.0 Hz; it only requires such settings be modeled by the Planning Coordinators in their UFLS assessments. Please refer to Project 2007-09 and PRC-024-1 for requirements on generator under-frequency settings.</p>		
US Army Corps of Engineers	No	<p>Without actually testing the UFLS, how do you know that the simulation testing adequately represents real world events? There needs to be more concrete assurance or testing of the generation side to show that the units will not trip off. I realize that this assurance should be covered under the MOD Reliability Standards, but I don't think it has been completely addressed.</p>
<p><b>Response:</b> There is always a question about how well simulation studies represent the real world. Model validation and event replication studies over several decades have increased industry confidence that simulation studies can, in principle, reasonably represent the dynamic behavior of real world power systems. As with any study, assumptions need to be carefully reviewed and validated. The SDT is aware that causes other than frequency-sensing relays may also trip generation outside the acceptable tripping boundaries being proposed in draft PRC-024-1, Attachment 1. Unfortunately, you are right in that this possibility is not being addressed in this standard. The SDT recommends that this matter be brought to the attention of the Project 2007-09, Generator Verification SDT responsible for PRC-024-1.</p>		
NIPSCO	No	<p>The existing trip points with out time delay is 58.2 - To protect against turbine blade damage.I believe any under frequency event that allows the frequency to get to 58 HZ is to late/ and to slow.</p>
<p><b>Response:</b> The SDT disagrees. While it is true that ECAR Document 3 listed 58.2 Hz as the point to expect immediate generator tripping, according to major generator manufacturer's documents, generators can tolerate frequency excursions for limited time below this level. Please refer to Project 2007-09 and PRC-024-1.</p>		
Public Service Electric and Gas Company	No	<p>No, however, while the effort to determine if the UFLS program is effective if generators trip at or above a minimum frequency, we are not sure that any simulations are accurate enough to validate this. Every event is different, but if it can be accurately modeled, then it is a good approach.</p>
<p><b>Response:</b> There is always a question about how well simulation studies represent the real world. Model validation and event replication studies</p>		

Organization	Yes or No	Question 3 Comments:
<p>over several decades have increased industry confidence that simulation studies can, in principle, reasonably represent the dynamic behavior of real world power systems. As with any study, assumptions need to be carefully reviewed and validated.</p>		
<p>American Transmission Company</p>	<p>No</p>	<p>[This question actually applies to Requirement R7, not R8.]We agree that PCs should model the trip settings of any generators that may be trip during the simulated operation of the UFLS program. The applicable generator trip settings will depend on the set points and time delays of the underfrequency relays in the UFLS program. We suggest that R7.1 be reworded to "that trip at or above the minimum frequency set points and time delays of the applicable island's UFLS program". This approach gives consideration to the time delay aspect and allows the frequency limit to be higher (or lower), if it is permitted by the applicable island's UFLS program.We suggest similar rewording for R7.2, "that trip at or above the maximum frequency set points and time delays of the applicable island's UFLS program".On a related matter, the root Requirement R7 states "conduct a UFLS assessment . . . through dynamic simulations". However, other analytical methods, such as Equivalent Inertia Anaysis, can also be used to perform an appropriate UFLS assessment and may check for proper coordination between the underfrequency relay settings and the generator trip settings. Therefore, we suggest that the following rewording for R7, "shall conduct a UFLS assessment . . . that determines whether the UFLS program design meets . . . R6. The assessment shall include:"R7.1 "Analysis of the trip settings of any generators that . . ."R7.2 "Analysis of the trip settings of any generators that . . ." R7.3 "Analysis of any automatic load restoration that . . ."See the response to Question 8 for comment on the 58.0 Hz and 61.8 Hz limits.</p>
<p><b>Response: The SDT apologizes for the incorrect reference to R8. The SDT agrees with your principle and has modified the standard to be more specific on what generator trip settings must be modeled. Temporary frequency excursions below the UFLS program set points and time delays could occur and the SDT wants to be sure that the assessments do not overlook any generator trip settings just below UFLS set points or just beyond the UFLS relay time delay settings that may still be reached. The standard has been modified to require, in the UFLS assessments per R4, the modeling of generator trip settings according to curves as shown in Attachments 1 and 2. These curves are the same as the proposed curves in PRC-024-1, Attachment 1. Nothing in the standard precludes the use of Equivalent Inertia Analysis in the UFLS design process, but the SDT believes that dynamic simulations are the most dependable means of assessing compliance to the performance characteristics in R6. Equivalent inertia analysis would not include the effects of island initiating disturbances on localized frequency and voltage, inter-machine oscillations, or the particular response of individual unit governors.</b></p>		
<p>FirstEnergy Corp</p>	<p>No</p>	<p>The Planning Coordinator should be required to model somewhat below the 58.0 Hz level, we suggest down to 57.5 Hz, so that a sensitivity analysis is performed evaluating the severity of frequency disturbance that is not fully arrested at or above the 58 Hz level. This information could be used to assess if additional load dropping may be needed for more severe frequency events.</p>
<p><b>Response: The standard has been modified to address your comment. The SDT has defined curves above and below which generator underfrequency and overfrequency protection, respectively, must be modeled. See R4 and Attachments 1 and 2. These curves are the same as the proposed curves in PRC-024-1, Attachment 1. As such, the minimum generator trip threshold that must be modeled is now 57.8 Hz, which the SDT</b></p>		

Organization	Yes or No	Question 3 Comments:
<b>believes provides adequate margin.</b>		
IRC Standards Review Committee	Yes	We agree but we think you meant R7, not R8. And assuming that the expected loss of generation (for generators tripping at or above 58.0 Hz) is to be compensated by selecting an additional, equivalent amount of load in the UFLS program, the additional load reduction would also need to be simulated.
<b>Response: Thank you for your support. The SDT apologizes for the incorrect reference to R8. The SDT agrees that any extra load shedding necessary for the UFLS program to comply with the performance characteristics in R6 (now R3) would need to be simulated.</b>		
Cowlitz County PUD	Yes	This seems fair to me. There is no mandate not to allow trip settings above 58 Hz, but there must be very good reasons for such settings, and that such settings will not require greater than necessary load shedding efforts to stabilize the BPS. DPs and LSEs are sensitive to reliable service to their customers. Unnecessary load shedding would add insult to injury.
<b>Response: Thank you for your support. Per R5 and R6 of the first draft of PRC-024-1, Generator Owners will need to document, subject to peer review, any generator under-frequency trip settings that fall outside the acceptable boundary defined by PRC-024-1, Attachment 1.</b>		
Independent Electricity System Operator	Yes	We agree but I think you meant R7, not R8. And assuming that the expected loss of generation (for generators tripping at or above 58.0 Hz) is to be compensated by selecting an additional, equivalent amount of load in the UFLS program, the additional load reduction would also need to be simulated. If this requirement is to be added, depending on how this is to be complied with the Applicability Section may need to be expanded.
<b>Response: Thank you for your support. The SDT apologizes for the incorrect reference to R8. The SDT agrees that any extra load shedding necessary for the UFLS program to comply with the performance characteristics in R6 (now R3) would need to be simulated. The applicability section does not need to be expanded because Planning Coordinators would still be the applicable entities to demonstrate compliance with R4 in R5.</b>		
Xcel Energy	Yes	The dynamic simulation would need to include any small generators (<20MVA or <75MVA aggregate) that are not required to register, but together, could have a material impact on the BES. Additionally, it would need to be clear who is responsible for ensuring those material impacts are included in models/simulations.
<b>Response: Thank you for your support. Although there are differing views on this question, the SDT has decided that it is sufficient to require the modeling of generator trip settings on small generators consistent with the NERC Statement of Compliance Registry Criteria. Please see R4. The Planning Coordinators are the responsible entity for ensuring that material impacts are included in UFLS assessments per R4 and R5.</b>		
TRE UFLS Standard Drafting Team	Yes	It would appear to be essential that the Planning Coordinators data base include trip settings and time delay to tripping for resources that trip above the 58.0 Hz point. The effective simulation and design of a regional UFLS plan must

Organization	Yes or No	Question 3 Comments:
		definitively show the targeted islanding of the region. By not including the modeling of the trip points and time delays for machines that trip above 58.0, Hz, the Planning Coordinator cannot ensure the simulation and plan for effective and survivable islands that can be forecasted to exist post separation. The time criteria in R6.2, particularly the first two cumulative steps, require the effective modeling of machines set to trip above 58.0 Hz.
<p><b>Response: Thank you for your support. Per R5 of the first draft of PRC-024-1, the Planning Coordinators will have information on generator under-frequency trip settings that fall outside the acceptable boundary defined by PRC-024-1, Attachment 1, and may include this in their database. Note that the standard has been modified to require, in the UFLS assessments per R4, the modeling of generator trip settings according to curves as shown in Attachments 1 and 2. These curves are the same as the proposed curves in PRC-024-1, Attachment 1.</b></p>		
Southern Company	Yes	The generators must be modeled to reflect the way they perform.
<p><b>Response: Thank you for your support.</b></p>		
ERCOT ISO	Yes	ERCOT ISO believes it is necessary to consider all automatic tripping schemes or protection schemes when designing an UFLS program to meet the requirements of this standard. However, explicit modeling of generator frequency trip settings (above 58.0Hz/below 61.8Hz) should only be required when they are relevant to satisfying the performance requirements of the standard (i.e. if generator trips are initiated for excursions lasting less than 30 seconds).
<p><b>Response: Thank you for your support. The standard has been modified to address your comment by defining curves above and below which generator underfrequency and overfrequency protection, respectively, must be modeled. These curves are the same as the proposed curves in PRC-024-1, Attachment 1. Please see R4 and Attachments 1 and 2.</b></p>		
Midwest ISO Stakeholders Standards Collaborators	Yes	Generation owners certainly have the right to set relays to protect their equipment from damage and are actually speeding restoration by doing so. Any units that will trip before frequency triggers UFLS relays should certainly be considered in the dynamic simulations.
<p><b>Response: Thank you for your support.</b></p>		
Luminant Power	Yes	Luminant agrees with the UFLS SDT that the Planning Coordinators should model the generators that would trip at or above 58.0 Hz, as required by R7. However, Requirement R8 of PRC-006 requires the Planning Coordinator to maintain a database of relay information only from Transmission Owners and Distribution Providers. The Planning Coordinator database in Requirement R8 should also include relay information from Generator Owners. The UFLS SDT does not need to include a requirement in PRC-006 for Generator Owners to provide the information, as the draft NERC Standard PRC-024 requires Generator Owners to provide frequency and voltage relay setting information to the Planning Coordinator.

Organization	Yes or No	Question 3 Comments:
<p><b>Response: Thank you for your support. Per R5 of the first draft of PRC-024-1, the Planning Coordinators will have information on generator under-frequency trip settings that fall outside the acceptable boundary defined by PRC-024-1, Attachment 1 and may include this in their database. The SDT agrees that the Generator Owner is already required by draft PRC-024-1 to supply this information to the Planning Coordinator and has removed this requirement from the draft standard.</b></p>		
Ameren	Yes	Yes, such generators should have their trip settings modeled to determine the additional load that must be shed because they do not meet performance characteristics. The cost to include this additional load shed should be allocated to these generators.
<p><b>Response: Thank you for your support. Cost allocation is outside the scope of reliability standards.</b></p>		
SERC UFLS Standards Drafting Team	Yes	he generators must be modeled to reflect the way they perform.
<p><b>Response: Thank you for your support.</b></p>		
Hydro-Québec TransEnergie (HQT)	Yes	See also our answer to Q8 in regards to the minimum frequency treshold.
<p><b>Response: Thank you for your support.</b></p>		
AEP	Yes	Please note that the reference to R8 in the question appears to an error.
<p><b>Response: Thank you for your support. The SDT apologizes for the incorrect reference to R8.</b></p>		
Pepco Holdings, Inc – Affiliates	Yes	
Bonneville Power Administration	Yes	
Northeast Power Coordinating Council	Yes	
Electric Market Policy	Yes	

**Consideration of Comments on Underfrequency Load Shedding Program Requirements — Project 2007-01**

Organization	Yes or No	Question 3 Comments:
FRCC Standards & Operations Departments	Yes	
Florida Municipal Power Agency and Select Members	Yes	
City of Bedford	Yes	
Alabama Municipal Electric Authority	Yes	
City of Bedford	Yes	
Alabama Municipal Electric Authority	Yes	
Central Lincoln	Yes	
Long island power Authority	Yes	
Exelon	Yes	
ReliabilityFirst Corporation	Yes	
Arkansas Electric Cooperative Corporation	Yes	
System Protection & Control	Yes	

Organization	Yes or No	Question 3 Comments:
ReliabilityFirst	Yes	
Ontario Power Generation	Yes	
We Energies	Yes	
PacifiCorp	Yes	
NextEra Energy Resources, LLC	Yes	

**4. The SDT added a requirement that requires the Planning Coordinators model, in the five year assessments, any automatic load restoration that is designed to assist in stabilizing system frequency (Requirement R9). The team decided to add this requirement as a result of a comment during the first posting. Do you agree that this requirement is necessary for reliability?**

**Summary Consideration:**

Most entities support this requirement.

Some want exceptions to be allowed to exclude this modeling from the program design if the automatic load restoration is “insignificant”. Some feel this requirement does not go far enough to include **ALL** automatic load restoration schemes which may impact UFLS, not just the ones **designed** to impact UFLS. The SDT believes that any automatic load restoration which impacts frequency stabilization and is designed to operate within the duration of the simulations run for the assessment should be modeled. The SDT modified the requirement (now Requirement R4, Part 4.7 in the revised standard) from “any automatic load restoration that is designed to assist in stabilizing frequency” to “any automatic load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.”

Some feel that automatic load restoration is generally a bad idea for use with UFLS. The SDT noted that the proposed standard does not require the use of automatic load restoration schemes and acknowledges this may not be a practical method to stabilize some systems. However, where automatic load restoration schemes are utilized a failure to consider them in assessments of the UFLS program design may result in unintended consequences during actual UFLS events. The SDT included modeling of automatic load restoration in UFLS program assessments to identify any unintended consequences of using automatic load restoration.

Organization	Yes or No	Question 4 Comments:
Alabama Municipal Electric Authority	No	If the automatic load was induced by inductors I would have voted yes because this is part of good planning. I voted "no" because there is no way to determine or predict that "all" of the load for a load restoration activity would be "available" if the automatic load restoration was for user or customer load.
<p><b>Response: The SDT makes no reference to the origination of the load to be included for automatic restoration in the UFLS program design. Where such automatic load restoration is utilized, the Planning Coordinators are required to model, in their UFLS program assessments, the actual scheme as implemented.</b></p>		
Public Service Electric and Gas Company	No	It would not seem practical to consider automatic load restoration as a method to stabilize a system.

Organization	Yes or No	Question 4 Comments:
<p><b>Response: The SDT is not requiring the use of automatic load restoration schemes and acknowledges this may not be a practical method to stabilize some systems. However, where automatic load restoration schemes are utilized a failure to consider them in assessments of the UFLS program design may result in unintended consequences during actual UFLS events.</b></p>		
Ameren	No	<p>Each region should be required to identify the amount of automatic load restoration in their region that is designed to assist in stabilizing system frequency. If the region determines that this amount is insignificant and will not materially impact the design of the region's UFLS program, then they should be allowed to exclude this load from their simulations.</p>
<p><b>Response: The SDT believes that any automatic load restoration which impacts frequency stabilization and is designed to operate within the duration of the simulations run for the assessment should be modeled.</b></p>		
TRE UFLS Standard Drafting Team	Yes	<p>The TRE UFLS SDT believes that successful deployment of a UFLS is dependent on two concepts. The first is automatic reaction of the UFLS when frequency triggers its response to dump load. The second is load shall not be brought back until the Reliability Coordinator instructs each entity to do so in whatever order is appropriate for adequate recovery. Therefore modeling of any applicable automatic load restoration should be included in a region's UFLS program.</p>
<p><b>Response: Thank you for your support.</b></p>		
Bonneville Power Administration	Yes	<p>It addresses automatic load restoration for frequency over-shoot.</p>
<p><b>Response: Thank you for your support.</b></p>		
Northeast Power Coordinating Council	Yes	<p>We believe that any automatic action that impacts recovery and stabilization of frequency must be modeled.</p>
<p><b>Response: Thank you for your support.</b></p>		
Southern Company	Yes	<p>Yes, but with the ability to specify exceptions. Each regional entity should be required to identify the amount of automatic load restoration in their region that is designed to assist in stabilizing system frequency. If the region determines that this amount is insignificant (e.g. 1%) and will not materially impact the design of the region's UFLS scheme, then they should be allowed to exclude this load from their simulations.</p>
<p><b>Response: The SDT believes that any automatic load restoration which impacts frequency stabilization and is designed to operate within the</b></p>		

Organization	Yes or No	Question 4 Comments:
<b>duration of the simulations run for the assessment should be modeled.</b>		
ERCOT ISO	Yes	At this time ERCOT ISO does not know of any automatic load restoration schemes within the ERCOT Interconnection. But as previously stated in question 3, it is necessary to consider all automatic tripping schemes when developing an UFLS program to meet the requirements of this standard, and therefore ERCOT ISO agrees this is necessary.
<b>Response: Thank you for your support.</b>		
Electric Market Policy	Yes	However, Question 4 reference to Requirement R9 should be R7.
<b>Response: The SDT apologizes for the incorrect reference to R9.</b>		
Midwest ISO Stakeholders Standards Collaborators	Yes	Generally, automatic load restoration is a bad idea. It could interfere with restoration. What if too much load is restored and actually causes frequency to decline significantly?
<b>Response: The SDT included modeling of automatic load restoration in UFLS program assessments to identify any unintended consequences of using automatic load restoration.</b>		
SERC UFLS Standards Drafting Team	Yes	Yes, but with the ability to specify exceptions. Each regional should be required to identify the amount of automatic load restoration in their region that is design to assist in stabilizing system frequency. If the region determines that this amount is insignificant (e.g. 1%) and will not materially impact the design of the region's UFLS scheme, then they should be allowed to excluded this load from their simulations.
<b>Response: The SDT believes that any automatic load restoration which impacts frequency stabilization and is designed to operate within the duration of the simulations run for the assessment should be modeled.</b>		
MRO NERC Standards Review Subcommittee	Yes	This question actually applies to Requirement R7.3, not R9.]We agree that any automatic load restoration that is designed to assist in stabilizing the system frequency should be modeled in the ULFS Program assessment.
<b>Response: The SDT apologizes for the incorrect reference to R9. Thank you for your support.</b>		

Organization	Yes or No	Question 4 Comments:
IRC Standards Review committee	Yes	<p>We agree with this requirement but believe there should be more specific language on what schemes should be included in the study. There may also be automatic load restoration schemes that have an impact on stabilizing system frequency but was not installed with that intent. The study should also consider the effects of these automatic restoration schemes.</p> <p>Again, we think you meant R7, not R9. We agree.</p> <p>Any pre-determined actions such as tripping of additional load for generator tripping at or above 58.0 Hz as discussed in Q3, above, and automatic restoration of load, etc. should be modeled and assessed via simulations to evaluate frequency performance of potential islands.</p>
<p><b>Response: The SDT believes that any automatic load restoration which impacts frequency stabilization and is designed to operate within the duration of the simulations run for the assessment should be modeled.</b></p> <p><b>The SDT apologizes for the incorrect reference to R9.</b></p> <p><b>Thank you for your support.</b></p>		
Cowlitz County PUD	Yes	<p>You meant Requirement R7.3? This seems to be an excellent idea to me. Anything that both stabilizes the BPS and improves on customer service is a winner.</p>
<p><b>Response: The SDT apologizes for the incorrect reference to R9. Thank you for your support.</b></p>		
US Army Corps of Engineers	Yes	<p>Modeling automatic load restoration on a 5 year cycle should capture the changes/modifications that the individual Registered Entities have done to their system. Too often the minor tweaks to a system get lost in the cracks and the cumulative modifications do have an impact on system studies.</p>
<p><b>Response: Thank you for your comments.</b></p>		
SPP System Protection and Control Working Group	Yes	<p>We agree with this requirement but believe there should be more specific language on what schemes should be included in the study. There may also be automatic load restoration schemes that have an impact on stabilizing system frequency but was not installed with that intent. The study should also consider the effects of these automatic restoration schemes.</p>
<p><b>Response: The SDT agrees and believes that any automatic load restoration which impacts frequency stabilization and is designed to operate within the duration of the simulations run for the assessment should be modeled.</b></p>		

Organization	Yes or No	Question 4 Comments:
Exelon	Yes	It should be clear only those restoration systems designed to stabilize system frequency should be included in the standard. Requirement 9 in the proposed standard does not appear to be related to automatic load restoration systems.
<p><b>Response: The SDT agrees and believes that any automatic load restoration which impacts frequency stabilization and is designed to operate within the duration of the simulations run for the assessment should be modeled.</b></p> <p><b>The SDT apologizes for the incorrect reference to R9.</b></p>		
Arkansas Electric Cooperative Corporation	Yes	It stands to reason that any tripping or restoration schemes that are automatic should be modeled and included in the simulations.
<p><b>Response: Thank you for your support.</b></p>		
Hydro-Québec TransEnergie (HQT)	Yes	HQT believe that any automatic action that impacts recovery and stabilization of frequency must be modeled.
<p><b>Response: Thank you for your support.</b></p>		
AEP	Yes	Please note that we are responding in the context of requirement 7.3, not requirement 9. There appears to be a error in the requirement 9 reference.
<p><b>Response: The SDT apologizes for the incorrect reference to R9.</b></p>		
American Transmission Company	Yes	<p>[This question actually applies to Requirement R7.3, not R9.]</p> <p>We agree that any automatic load restoration that is designed to assist in stabilizing the system frequency should be modeled in the ULFS Program assessment. On the other hand, we suggest that automatic load restoration should be avoided whenever possible.</p>
<p><b>Response: The SDT apologizes for the incorrect reference to R9.</b></p> <p><b>Thank you for your support.</b></p>		
Independent Electricity System	Yes	Again, we think you meant R7, not R9. We agree.

Organization	Yes or No	Question 4 Comments:
Operator		Any pre-determined actions such as tripping of additional load for generator tripping at or above 58.0 Hz as discussed in Q3, above, and automatic restoration of load, etc. should be modeled and assessed via simulations to evaluate frequency performance of potential islands.
<p><b>Response: The SDT apologizes for the incorrect reference to R9.</b>  <b>Thank you for your support.</b></p>		
Xcel Energy	Yes	(We assume you meant R7, not R9.)
<p><b>Response: The SDT apologizes for the incorrect reference to R9.</b></p>		
Kansas City Power & Light	Yes	
NIPSCO	Yes	
Central Lincoln	Yes	
Long island power Authority	Yes	
ReliabilityFirst Corporation	Yes	
System Protection & Control	Yes	
ReliabilityFirst	Yes	
Ontario Power Generation	Yes	
We Energies	Yes	

**Consideration of Comments on Underfrequency Load Shedding Program Requirements — Project 2007-01**

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Organization	Yes or No	Question 4 Comments:
PacifiCorp	Yes	
NextEra Energy Resources, LLC	Yes	
Luminant Power	Yes	
FirstEnergy Corp	Yes	
Pepco Holdings, Inc - Affiliates	Yes	
FRCC Standards & Operations Departments	Yes	
Florida Municipal Power Agency and Select Members	Yes	
Colmac Clarion	Yes	
City of Bedford	Yes	

5. **In the first posting, the Characteristics of UFLS Regional Reliability Standards required that UFLS programs be designed to limit the potential for overexcitation (V/Hz) of power system equipment at all Bulk Electric System buses. Based on industry comments, the SDT has revised this requirement in the proposed continent-wide standard to apply only at generator buses and generator step-up transformer high-side buses associated with individual generating units greater than 20 MVA (gross nameplate rating) and generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) that are directly connected to the BES. The SDT believes this change better addresses the need to have UFLS programs designed to coordinate with protection that may trip generators during an underfrequency event. Do you agree with this change?**

#### **Summary Consideration:**

The SDT has considered industry input regarding the V/Hz performance characteristic. The majority of comments from the industry supported the changes made to this requirement in the second posting.

However, the team identified the need to make two clarifying changes to the requirement. Based on its own review of the requirement the SDT decided to remove any ambiguity as to whether modeling is required when all or only one threshold is met by combining R 6.4.1 and R6.4.2 with “OR” (now Part 3.3.1 of R3). Based on a comment the SDT also added a third threshold in Part 3.3.1 of R3 to clarify our intent to include wind generation, by adding “Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.” Thus, the applicability is limited to locations at which individual generating units greater than 20 MVA (gross nameplate rating) or generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) are directly connected to the BES or any facility consisting of one or more units that are connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating. The SDT believes that the requirement as written generally captures about 95 percent of utility-owned installed capacity. The SDT believes that reliability of the UFLS program is supported by assessing the potential for this amount of generation to trip during events involving off-nominal frequency and voltage. The SDT also has modified Requirements R7.1 and R7.2 (now Parts 4.1 through 4.6 of Requirement R4) to apply to the same generating units and plants.

The SDT acknowledges excitation models do not include V/Hz limiters; however, we also believe that meaningful results can be obtained from conservative simulations without the V/Hz limiter. If the simulated system response exceeds the V/Hz performance characteristics in the standard, the group of Planning Coordinators would have the option of developing corrective actions as part of the UFLS program design or including additional modeling for generator units to demonstrate that the V/Hz limiter would prevent the overexcitation condition.

Organization	Yes or No	Question 5 Comments:
NIPSCO	No	4 seconds is too long.
<p><b>Response:</b> The proposed point provides 0.2 Hz margin between the generator tripping curve proposed in PRC-024 and the UFLS performance characteristics. The SDT believes that decreasing the time to less than four seconds is not necessary to coordinate the UFLS program with the generator protection requirements in PRC-024 and would place an unnecessary burden on the group of Planning Coordinators responsible for the UFLS program design.</p>		
Midwest ISO Stakeholders Standards Collaborators	No	<p>Please provide the technical justification for this performance criterion. We would like to add the statement "Unless generation capability or protection warrants or allows for a lower limit" to the end of the requirement. In the MRO region, this would help Manitoba Hydro and Saskatchewan that need to shed more than 30% of the area load. In these areas, when shedding that much load the frequency would drop below 58.2 Hz for longer than 4 seconds. We understand the SDT wants to ensure load shedding programs achieve quick frequency recovery and minimize underfrequency exposure. However we do not feel this requirement is the right way to go about that. This type of criteria is overly specific and should not be in the NERC standard. The recently developed MRO UFLS program which sheds 30% of system load appears to meet this criteria, but the Canadian portions of MRO which have higher load shedding requirements are unlikely meet this criteria. Aggressive load shedding programs in general will probably not satisfy this requirement. Frequency recovery, overall load shedding performance, and coordination with generation protection, should all be evaluated at the regional level by those who do the technical analysis of regional load shedding programs. In addition to study work, a lot of common sense needs to be applied. Several things need to be discussed to clarify our position.</p>
<p><b>Response:</b> This criterion was selected to provide margin between the generator tripping curve proposed in PRC-024 and the UFLS performance characteristics. The SDT does not believe it is necessary to modify the requirement as suggested because the performance characteristics in R6 (R4 in the revised standard) of the draft PRC-006 standard would NOT apply to load-generation imbalances over 25 percent. A UFLS program capable of shedding more than 25 percent of a system's load would only need to comply with the performance characteristics up to a 25 percent load-generation imbalance. Beyond a 25 percent load-generation imbalance, the group of Planning Coordinators within a region would not be subject to these requirements and could devise other performance characteristics that would apply under load-generation imbalance scenarios greater than 25 percent. The SDT did, however, modify the underfrequency performance characteristic, as shown in the Attachment 1 Underfrequency Curves, noting that some entities could have difficulty recovering frequency within 30 seconds with a 25 percent imbalance. This modification to the performance characteristic still maintains a 0.2 Hz margin with the generator tripping limitations proposed by the Generator Verification STD.</p> <p>The SDT understands the concern over bigger sub-regional UFLS programs. The SDT recognizes that Planning Coordinators in a region with a 60 percent capable UFLS program, for example, may have trouble complying with the performance characteristics even under a 25 percent load-generation imbalance scenario. The SDT is not convinced that it would be impossible to comply, but can see that it could be more difficult.</p>		

Organization	Yes or No	Question 5 Comments:
<p><b>Assessments that demonstrate the reliability objective of PRC-006 can be met without meeting the performance characteristics in Requirement R6 (R4 in the revised standard) could be used to support a request for a regional variance.</b></p>		
<p>MRO NERC Standards Review Subcommittee</p>	<p>No</p>	<p>Please provide the technical justification for this performance criteria. We suggest the addition of the statement "Unless generation capability or protection warrants or allows for a lower limit" to the end of Requirement R6.2. In the MRO region, this qualification would help Manitoba Hydro and Saskatchewan that need to shed more than 30% of the area load to achieve reasonable frequency recovery in these islands. In these areas, the shedding of a higher percentage of load may allow the frequency to drop below 58.2 Hz for longer than 4 seconds, but the subsequent impacts on the hydro generator in these islands are acceptable. On a related note, we suggest the addition of the statement "Unless generation capability or protection warrants or allows for a higher limit" to the end of Requirement R6.3, if the impacts of island equipment are acceptable.</p>
<p><b>Response:</b> This criterion was selected to provide margin between the generator tripping curve proposed in PRC-024 and the UFLS performance characteristics. The SDT does not believe it is necessary to modify the requirement as suggested because the performance characteristics in R6 of the draft PRC-006 standard (R4 in the revised standard) would NOT apply to load-generation imbalances over 25 percent. An UFLS program capable of shedding more than 25 percent of a system's load would only need to comply with the performance characteristics up to a 25 percent load-generation imbalance. Beyond a 25 percent load-generation imbalance, the group of Planning Coordinators within a region would not be subject to these requirements and could devise other performance characteristics that would apply under load-generation imbalance scenarios greater than 25 percent. The SDT did, however, modify the underfrequency performance characteristic, as shown in the Attachment 1 Underfrequency Curves, noting that some entities could have difficulty recovering frequency within 30 seconds with a 25 percent imbalance. This modification to the performance characteristic still maintains a 0.2 Hz margin with the generator tripping limitations proposed by the Generator Verification STD.</p> <p>The SDT understands the concern over bigger sub-regional UFLS programs. The SDT recognizes that Planning Coordinators in a region with a 60 percent capable UFLS program, for example, may have trouble complying with the performance characteristics even under a 25 percent load-generation imbalance scenario. The SDT is not convinced that it would be impossible to comply, but can see that it could be more difficult.</p> <p><b>Assessments that demonstrate the reliability objective of PRC-006 can be met without meeting the performance characteristics in Requirement R6 (R4 in the revised standard) could be used to support a regional variance.</b></p>		
<p>Kansas City Power &amp; Light</p>	<p>No</p>	<p>Do not have a problem with a frequency threshold or duration, however, 58.2Hz and 4 seconds sounds arbitrary. UFLS systems have been in place for years and would be very difficult and expensive to modify to meet the criteria stated here. To justify any need to go to that expense, it is important to establish the engineering basis for this criteria. What is the engineering basis for the 58.2Hz and 4 seconds?</p>
<p><b>Response:</b> The proposed point was selected to provide 0.2 Hz margin between the generator tripping curve proposed in PRC-024 and the UFLS performance characteristics. Based on industry input the SDT has replaced the discrete points in the proposed standard with a continuous curve that provides consistent 0.2 Hz margin between 0 and 60 seconds. The SDT does not anticipate that existing UFLS programs will need to be</p>		

Organization	Yes or No	Question 5 Comments:
<p>redesigned to meet this requirement for load-generation imbalances up to 25 percent. However, the group of Planning Coordinators in a region could pursue a variance if their existing UFLS program does not meet the requirement.</p>		
FirstEnergy Corp	No	<p>The requirement does not exactly match those in PRC-024-1 (Attachment 1) on generator frequency characteristics. In fact, reliability would be better served if the frequency requirements for generators was in PRC-006 rather than PRC-024. For UFLS to be effective, it is a fundamental concept that generation stay connected long enough for load shedding to fully occur. By separating these requirements into different standards, it discounts the need to balance load and generation in a stressed system. PRC-024 allows GO's to be granted exceptions to meeting a fairly generous frequency characteristic but there are no assurances that an equivalent load is shed to balance these exceptions.</p>
<p><b>Response:</b> The SDT's intent is to provide margin to minimize the risk of generators tripping prematurely during an underfrequency event. Based on industry comment, the SDT has clarified this requirement by replacing the discrete points in the proposed standard with a continuous curve that provides a consistent 0.2 Hz margin between 0 and 60 seconds. While the SDT recognizes that regional criteria traditionally have included underfrequency load shedding and generator trip limits in a single document, this has the disadvantage of spreading generator requirements across multiple standards. The SDT believes system reliability can be maintained as long as the UFLS performance characteristics and the generator trip limits are coordinated regardless of the standards in which these requirements reside.</p>		
Duke Energy	No	<p>We agree this change better coordinates with PRC-024.If coordination with PRC-024 is the ultimate goal, it seems a simple offset would be better. For example, adding 0.1 Hz to the PRC-024 underfrequency requirements would seem more straightforward and provide a more consistent offset ( 58 Hz at 3 sec and 59.6 Hz at 1800 sec.) The stair step created by the proposed method greatly reduces the area available above the PRC-024 limit.[SERC UVLS team see chart below]Even with the added requirement, the UFLS curve still does not coordinate with the PRC 024 curve at 59.5 Hz. If the 59.3 Hz proposed by PRC-006 is maintained, then it seems PRC-024 should be approximately 0.1 Hz lower, 59.2 Hz. Otherwise, the upper limit for PRC-006 must be increased to coordinate with the PRC-024 curve (e.g. increase by 0.3 Hz to 59.6 Hz). Similarly, the upper requirement does not coordinate with PRC-024 out in time.</p>
<p><b>Response:</b> Thank you for your support. The SDT has adopted an approach that provides a constant offset of 0.2 Hz between 0 and 60 seconds.</p>		
Exelon	No	<p>This should be left up to the regions. Load trip set points are left up to the Regions and thus so should generating unit settings. Unit coordination requirements should be part of the PRC standards (PRC-001 and PRC-024). This requirement leaves the responsibilities of attaining this goal ambiguous. It would not be appropriate to base compliance on an entity performing a study on the study outcome.</p>
<p><b>Response:</b> The SDT agrees that unit coordination requirements should be established in PRC-024 and notes that the proposed UFLS standard does not establish requirements for generator trip settings. The proposed UFLS standard requires the group of Planning Coordinators within a</p>		

Organization	Yes or No	Question 5 Comments:
<b>region to design and establish the requirements for the UFLS program to coordinate with the generator requirements established in PRC-024.</b>		
American Transmission Company	No	Please provide the industry with the technical justification for this performance criteria. We would like to add the statement "Unless generation capability or protection warrants or allows for a lower limit" to the end of Requirement R6.2 and R6.3. In the MRO region, this qualification would help Manitoba Hydro and Saskatchewan that need to shed more than 30% of the area load to achieve reasonable frequency recovery in these islands. In these areas, the shedding this quantity of load may allow the frequency to drop below 58.2 Hz for longer than 4 seconds, but the subsequent impacts on the hydro generators in these islands are acceptable.
<p><b>Response:</b> This criterion was selected to provide margin between the generator tripping curve proposed in PRC-024 and the UFLS performance characteristics. The SDT does not believe it is necessary to modify the requirement as suggested because the performance characteristics in R6 of the draft PRC-006 standard (R4 in the revised standard) would NOT apply to load-generation imbalances over 25 percent. An UFLS program capable of shedding more than 25 percent of a system's load would only need to comply with the performance characteristics up to a 25 percent load-generation imbalance. Beyond a 25 percent load-generation imbalance, the group of Planning Coordinators within a region would not be subject to these requirements and could devise other performance characteristics that would apply under load-generation imbalance scenarios greater than 25 percent. The SDT did, however, modify the underfrequency performance characteristic noting that some entities may have difficulty recovering frequency within 30 seconds with a 25 percent imbalance. This modification to the performance characteristic still maintains a 0.2 Hz margin with the generator tripping limitations proposed by the Generator Verification STD.</p> <p>The SDT understands the concern over bigger sub-regional UFLS programs. The SDT recognizes that Planning Coordinators in a region with a 60 percent capable UFLS program, for example, may have trouble complying with the performance characteristics even under a 25 percent load-generation imbalance scenario. The SDT is not convinced that it would be impossible to comply, but can see that it could be more difficult. Assessments that demonstrate the reliability objective of PRC-006 can be met without meeting the performance characteristics in Requirement R6 (R4 in the revised standard) could be used to support a regional variance.</p>		
TRE UFLS Standard Drafting Team	Yes	The TRE UFLS SDT agrees that the UFLS program should coordinate with the performance requirements of the Generation Verification Project (PRC-024-1). The requirement for not remaining below 58.2 Hz for greater than four seconds appears to be within the No Trip Zone area of the Off Normal Frequency Capability Curve in Attachment 1 of PRC-024-1.
<b>Response: Thank you for your support.</b>		
Northeast Power Coordinating Council	Yes	We believe it is important to remove this apparent miscoordination between the generator tripping requirements in PRC-024 and the UFLS program performance requirements in PRC-006.
<b>Response: Thank you for your support</b>		

Organization	Yes or No	Question 5 Comments:
ERCOT ISO	Yes	ERCOT ISO agrees that the UFLS program should coordinate with the performance requirements of the Generation Verification Project (PRC-024-1). The requirement for not remaining below 58.2 Hz for greater than four seconds appears to be within the No Trip Zone area of the Off Normal Frequency Capability Curve in Attachment 1 of PRC-024-1.
<b>Response: The SDT appreciates your support.</b>		
IRC Standards Review Committee	Yes	We do not have a concern with this requirement if the 0.2 Hz above 58.0 Hz is intended as a margin/buffer to ensure generators do not trip pre-maturely.
<b>Response: The SDT's intent is to provide margin to minimize the risk of generators tripping prematurely during an underfrequency event. The SDT thanks you for your comment.</b>		
Colmac Clarion	Yes	Agree that it is a reasonable setpoint for consistent evaluation/simulation; may not be reasonable as a 'limit' after evaluation is complete.
<b>Response: The proposed point was selected to provide 0.2 Hz margin between the generator tripping curve proposed in PRC-024 and the UFLS performance characteristics. Based on industry input the SDT has replaced the discrete points in the proposed standard with a continuous curve that provides consistent 0.2 Hz margin between 0 and 60 seconds.</b>		
Alabama Municipal Electric Authority	Yes	The SDT should consider changing the four seconds to six seconds because of the data scanning requirements of other generator functions such as automatic generation control.
<b>Response: Thank you for your support. The proposed point provides 0.2 Hz margin between the generator tripping curve proposed in PRC-024 and the UFLS performance characteristics. The SDT believes that increasing the time to six seconds would not provide adequate margin to minimize the risk of generators tripping prematurely during an underfrequency event.</b>		
Independent Electricity System Operator	Yes	We do not have a concern with this requirement if the 0.2 Hz above 58.0 Hz is intended as a margin/buffer to ensure generators do not trip pre-maturely. However, we do have a concern with R6.3. During the 2003 blackout, the overfrequency limits in R6.3 were violated without any reported adverse effects on the BES. Why are the overfrequency limits needed? If they are not needed to protection equipment, then they should be removed.
<b>Response: Thank you for your comments. The SDT has developed the overfrequency characteristic in Requirement R6.3 to coordinate with the overfrequency trip setting limits proposed in PRC-024. The trip setting limits were developed by the Generator Verification SDT based on the withstand capabilities of generating units. The concern with operation of generating units at off-nominal frequency is the cumulative fatigue effect, so it is possible that generating units experienced significant loss of life on August 14, 2003 even if the adverse effects were not readily</b>		

Organization	Yes or No	Question 5 Comments:
<b>observable immediately after this event.</b>		
Xcel Energy	Yes	We support the philosophy that load shedding should occur prior to generation tripping. We feel it is important to keep these two projects coordinated.
<b>Response: Thank you for your support.</b>		
Hydro-Québec TransEnergie (HQT)	Yes	HQT believe it is important to remove this apparent miscoordination between the generator tripping requirements in PRC-024 and the UFLS program performance requirements in PRC-006. See also our answer to Q8 in regards to frequency treshold.
<b>Response: Thank you for your support. Please see also our response to your comment on Question 8.</b>		
Hydro-Québec TransEnergie (HQT)	Yes	HQT believe it is important to remove this apparent miscoordination between the generator tripping requirements in PRC-024 and the UFLS program performance requirements in PRC-006. See also our answer to Q8 in regards to frequency treshold.
<b>Response: Thank you for your support. Please see also our response to your comment on Question 8.</b>		
PacifiCorp	Yes	Coordination with PRC-024 is very important. PacifiCorp supports this change.
<b>Response: Thank you for your support.</b>		
Ameren	Yes	It is a step in the right direction but additional modifications to the performance characteristics are needed to coordinate effectively with PRC-024. When viewing the frequency and time limits in PRC-024 simultaneously with this draft standard in a graphical manner, there are regions of frequency and time duration for which it is permitted for the generators to operate, but for which it is not permitted for the system as a whole to operate.
<b>Response: The SDT intent is to provide margin to minimize the risk of generators tripping prematurely during an underfrequency event. Based on industry comments, the SDT has clarified this requirement by replacing the discrete points in the proposed standard with a continuous curve that provides a consistent 0.2 Hz margin between 0 and 60 seconds.</b>		
Southern Company		We agree this change better coordinates with PRC-024. If coordination with PRC-024 is the ultimate goal, it seems a simple offset would be better. For example, adding 0.1 Hz to the PRC-024 underfrequency requirements would seem more straightforward and provide a more consistent offset ( 58 Hz at 3 sec and 59.6 Hz at 1800 sec.).

Organization	Yes or No	Question 5 Comments:
<p><b>Response: Thank you for your support. The SDT has adopted an approach that provides a constant offset of 0.2 Hz between 0 and 60 seconds.</b></p>		
<p>SERC UFLS Standards Drafting Team</p>		<p>We agree this change better coordinates with PRC-024. If coordination with PRC-024 is the ultimate goal, it seems a simple offset would be better. For example, adding 0.1 Hz to the PRC-024 underfrequency requirements would seem more straightforward and provide a more consistent offset ( 58 Hz at 3 sec and 59.6 Hz at 1800 sec.)</p>
<p><b>Response: Thank you for your support. The SDT has adopted an approach that provides a constant offset of 0.2 Hz between 0 and 60 seconds.</b></p>		
<p>ReliabilityFirst Corporation</p>	<p>Yes</p>	
<p>System Protection &amp; Control</p>	<p>Yes</p>	
<p>ReliabilityFirst</p>	<p>Yes</p>	
<p>AEP</p>	<p>Yes</p>	
<p>Ontario Power Generation</p>	<p>Yes</p>	
<p>We Energies</p>	<p>Yes</p>	
<p>NextEra Energy Resources, LLC</p>	<p>Yes</p>	
<p>Luminant Power</p>	<p>Yes</p>	
<p>City of Bedford</p>	<p>Yes</p>	
<p>US Army Corps of Engineers</p>	<p>Yes</p>	
<p>Central Lincoln</p>	<p>Yes</p>	

**Consideration of Comments on Underfrequency Load Shedding Program Requirements — Project 2007-01**

Organization	Yes or No	Question 5 Comments:
SPP System Protection and Control Working Group	Yes	
Long island power Authority	Yes	
City of Bedford	Yes	
US Army Corps of Engineers	Yes	
Central Lincoln	Yes	
SPP System Protection and Control Working Group	Yes	
Long island power Authority	Yes	
Pepco Holdings, Inc – Affiliates	Yes	
Bonneville Power Administration	Yes	
Electric Market Policy	Yes	
FRCC Standards & Operations Departments	Yes	
Florida Municipal Power Agency and	Yes	

**Consideration of Comments on Underfrequency Load Shedding Program Requirements — Project 2007-01**

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Organization	Yes or No	Question 5 Comments:
Select Members		
Cowlitz County PUD	Yes	

- 6. In the first posting, the Characteristics of UFLS Regional Reliability Standards required that UFLS programs be designed to limit the potential for overexcitation (V/Hz) of power system equipment at all Bulk Electric System buses. Based on industry comments, the SDT has revised this requirement in the proposed continent-wide standard to apply only at generator buses and generator step-up transformer high-side buses associated with individual generating units greater than 20 MVA (gross nameplate rating) and generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) that are directly connected to the BES. The SDT believes this change better addresses the need to have UFLS programs designed to coordinate with protection that may trip generators during an underfrequency event. Do you agree with this change?**

#### **Summary Consideration:**

The SDT has considered industry input regarding the V/Hz performance characteristic. The majority of comments from the industry supported the changes made to this requirement in the second posting.

However, the team identified the need to make two clarifying changes to the requirement. Based on its own review of the requirement the SDT decided to remove any ambiguity as to whether modeling is required when all or only one threshold is met by combining R 6.4.1 and R6.4.2 with “OR” (now Part 3.3.1 of R3). Based on a comment the SDT also added a third threshold in Part 3.3.1 of R3 to clarify our intent to include wind generation, by adding “Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.” Thus, the applicability is limited to locations at which individual generating units greater than 20 MVA (gross nameplate rating) or generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) are directly connected to the BES or any facility consisting of one or more units that are connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating. The SDT believes that the requirement as written generally captures about 95 percent of utility-owned installed capacity. The SDT believes that reliability of the UFLS program is supported by assessing the potential for this amount of generation to trip during events involving off-nominal frequency and voltage. The SDT also has decided to modify Requirements R7.1 and R7.2 (now Parts 4.1 through 4.6 of Requirement R4) to apply to the same generating units and plants.

The SDT acknowledges excitation models do not include V/Hz limiters; however, we also believe that meaningful results can be obtained from conservative simulations without the V/Hz limiter. If the simulated system response exceeds the V/Hz performance characteristics in the standard, the group of Planning Coordinators would have the option of developing corrective actions as part of the UFLS program design or including additional modeling for generator units to demonstrate that the V/Hz limiter would prevent the overexcitation condition.

Organization	Yes or No	Question 6 Comments:
Northeast Power Coordinating Council	No	<p>We agree with the intent of the change to focus the concern on buses where V/Hz protection may trip generators rather than broadly applying to all BES buses. However, reliability of underfrequency load shedding (UFLS) programs is dependent on assurance that the UFLS program will shed load prior to generation tripping in islanded conditions. The frequency response to generator tripping is primarily a function of the amount of generation tripped and is substantially independent of the location of the generator interconnection. Therefore, the standard should not specify a threshold on interconnection voltage or generating unit/plant nameplate MVA. We recommend that R6.4 apply to all generator buses and generator step-up (GSU) high-side buses similar to R7.1 and R7.2 applying to all generators that trip above 58.0 Hz or below 61.8 Hz.</p>
<p><b>Response: Thank you for your suggestion. The SDT has considered all industry input and has decided only to make clarifying modifications to the requirement. The SDT believes that the requirement as written generally captures about 95 percent of utility-owned installed capacity, which the team believes is sufficient accuracy for assessments of UFLS programs. The SDT also has decided to modify Requirements R7.1 and R7.2 (now Parts 4.1 through 4.6 of Requirement R4) to apply to the same generating units and plants.</b></p>		
Midwest ISO Stakeholders Standards Collaborators	No	<p>Please provide the technical justification for this performance criteria. We are presently unaware of any UFLS event where V/Hz tripped a unit. This requirement should not be included with this standard because it cannot be properly simulated because the voltage regulator V/Hz controls are not presently included in generator exciter/voltage regulator models that are used for stability simulation. The volts per hertz language does not belong in this load shedding document. Voltage regulators automatically reduce voltage according to volts per hertz when in automatic mode. Industry recommendations/standards (IEEE C37.102 or IEEE C37.106, ANSI C50.13-1989, IEEE C57.12.00-2000) already exist to address volts/Hz. If voltage regulators fail, or are in manual control, then there is additional volts/Hz relaying to trip generation if needed. We believe the volts per hertz issues are already taken care of outside of this UFLS standards document. During an under frequency event, generators should be working to pull voltages down anyway. Please see response to question 8 regarding overvoltages related to tripping load without tripping capacitors.</p>
<p><b>Response: It is appropriate to include this performance characteristic in this project because overexcitation that occurs as a direct result of UFLS operations must be considered when UFLS programs are designed. The SDT notes that the subject of the cited IEEE and ANSI standards is design and protection of generators and transformers. The proposed Requirement R6.4 (now Part 3.3 of Requirement R3) is a system performance requirement that is coordinated with these standards. If design verification studies demonstrate the potential for generator tripping, corrective measures must be applied to prevent further unnecessary outages or disturbances that would result from tripping the generator.</b></p> <p><b>The SDT acknowledges excitation models do not include V/Hz limiters; however, we also believe that meaningful results can be obtained from conservative simulations without the V/Hz limiter. If the simulated system response exceeds the V/Hz performance characteristics in the standard, the group of Planning Coordinators would have the option of developing corrective actions as part of the UFLS program design or including</b></p>		

Organization	Yes or No	Question 6 Comments:
<p><b>additional modeling for generator units to demonstrate that the V/Hz limiter would prevent the overexcitation condition.</b></p>		
<p>MRO NERC Standards Review Subcommittee</p>	<p>No</p>	<p>Please provide the technical justification for this performance criteria. We are unaware of any UFLS event where V/Hz protection tripped a generator unit. This requirement should not be included with this standard because it cannot be properly simulated. The voltage regulator V/Hz controls are not presently included in generator exciter/voltage regulator models of the present power system modeling programs that are used for dynamic power system simulation. The volts per hertz language does not belong in this load shedding document. Voltage regulators automatically reduce voltage according to volts per hertz when in automatic mode. Industry recommendations/standards (IEEE C37.102 or IEEE C37.106, ANSI C50.13-1989, IEEE C57.12.00-2000) already exist to address volts/Hz. If voltage regulators fail, or are in manual control, then there is additional volts/Hz relaying to trip generation if needed. We believe the volts per hertz issues are already taken care of outside of this UFLS standards document.</p>
<p><b>Response: It is appropriate to include this performance characteristic in this project because overexcitation that occurs as a direct result of UFLS operations must be considered when UFLS programs are designed. The SDT notes that the subject of the cited IEEE and ANSI standards is design and protection of generators and transformers. The proposed Requirement R6.4 (now Part 3.3 of Requirement R3) is a system performance requirement that is coordinated with these standards. If design verification studies demonstrate the potential for generator tripping, corrective measures must be applied to prevent further unnecessary outages or disturbances that would result from tripping the generator.</b></p> <p><b>The SDT acknowledges excitation models do not include V/Hz limiters; however, we also believe that meaningful results can be obtained from simulations without the V/Hz limiter. If the simulated system response exceeds the V/Hz performance characteristics in the standard, the group of Planning Coordinators would have the option of developing corrective actions as part of the UFLS program design or including additional modeling for generator units to demonstrate that the V/Hz limiter would prevent the overexcitation condition.</b></p>		
<p>IRC Standards Review Committee</p>	<p>No</p>	<p>We do not see the need to specify these criteria in the standard. Applicable requirements should be assigned to all generators that meet the compliance registry criteria.</p>
<p><b>Response: Thank you for your comment. The SDT agrees it would not be necessary to restate these criteria if we were assigning responsibility to the Generator Owners. However, in this case we are defining generator modeling requirements for the Planning Coordinators. The SDT believes that the requirement as written generally captures about 95 percent of utility-owned installed capacity. The SDT believes that reliability of the UFLS program is supported by assessing the potential for this amount of generation to trip during events involving off-nominal frequency and voltage. The SDT is specifying these criteria rather than referencing the NERC Statement of Registration Criteria to ensure the technical requirements of this standard are independent of the NERC Statement of Compliance Registry.</b></p>		
<p>Hydro-Québec TransEnergie (HQT)</p>	<p>No</p>	<p>HQT agree with the intent of the change to focus the concern on buses where V/Hz protection may trip generators rather than broadly applying to all BES buses. However, reliability of underfrequency load shedding (UFLS) programs is dependent on assurance that the UFLS program will shed load prior to generation tripping</p>

Organization	Yes or No	Question 6 Comments:
		<p>in islanded conditions. The frequency response to generator tripping is primarily a function of the amount of generation tripped and is substantially independent of the location of the generator interconnection. Therefore, the standard should not specify a threshold on interconnection voltage or generating unit/plant nameplate MVA. We recommend that R6.4 apply to all generator buses and generator step-up (GSU) high-side buses similar to R7.1 and R7.2 applying to all generators that trip at particular frequency thresholds. See also our answer to Q8 in regards to frequency threshold.</p>
<p><b>Response: The SDT agrees that the impact of generator tripping on system frequency is independent of the interconnection voltage. However, the SDT believes it is not necessary or practical to assess the potential for tripping of every generator unit. The majority of comments from the industry supported the changes made to this requirement in the second posting. The SDT has considered all industry input and has decided only to make clarifying modifications to the requirement. The SDT believes that the requirement as written generally captures about 95 percent of utility-owned installed capacity. The SDT believes that reliability of the UFLS program is supported by assessing the potential for this amount of generation to trip during events involving off-nominal frequency and voltage. The SDT also has decided to modify Requirements R7.1 and R7.2 (now Parts 4.1 through 4.6 of Requirement R4) to apply to the same generating units and plants.</b></p>		
Kansas City Power & Light	No	<p>Do not agree with requirement R6.4 regarding the criteria for ensuring control voltage at the generator does not exceed 1.18 V/Hz for a duration longer than 2 seconds. The operating boundaries and control schemes at the generators are in place for the protection and reliable operation of the generator and should be modeled as they are and UFLS design should be modeled around the generator in the attempt to maintain generator connection to the grid.</p>
<p><b>Response: Thank you for your comment. The intent of this requirement is as the commenter suggests: to design the UFLS program around the generator in an attempt to maintain generator connection to the grid. However, instead of requiring the Planning Coordinators to model the over-excitation protection of each generator unit and generator step-up transformer the SDT has developed this performance characteristic based on the relevant IEEE standards governing equipment design and protection. The SDT believes this approach achieves the same objective without requiring extensive collection of data and modeling of over-excitation protection.</b></p>		
NIPSCO	No	<p>Since much of the future generation seems to be wind power- they should be included</p>
<p><b>Response: The SDT had intended to include wind generators and has modified Requirement R6.4 (now Part 3.3 of Requirement R3) to clarify this intent.</b></p> <p><b>The SDT has modified Part 3.3 to include a reference to “Facilities consisting of one or more units connected to the bulk electric system at a common bus with total generation above 75 MVA gross nameplate rating.”</b></p>		
Exelon	No	<p>Don't agree with going into the generator over excitation equipment. This is an issue that is regional in nature</p>

Organization	Yes or No	Question 6 Comments:
		and should be addressed at that level.
<p><b>Response:</b> Thank you for your comment. It is appropriate to include this performance characteristic in this project because overexcitation that occurs as a direct result of UFLS operations must be considered when UFLS programs are designed. The SDT believes that excitation equipment and generator design and protection is sufficiently uniform across North America that a continent-wide performance requirement is appropriate.</p> <p>The SDT believes that the requirement as written generally captures about 95 percent of utility-owned installed capacity. The SDT believes that reliability of the UFLS program is supported by assessing the potential for this amount of generation to trip during events involving off-nominal frequency and voltage.</p>		
American Transmission Company	No	<p>Please provide the industry with the technical justification for this performance criteria. We are presently unaware of any UFLS event where V/Hz tripped a generator unit. This requirement should not be included with this standard because it cannot be properly simulated. The voltage regulator V/Hz controls are not presently included in generator exciter/voltage regulator models of the present power system modeling programs that are used for dynamic power system simulation. The volts per hertz language does not belong in this load shedding document. Voltage regulators automatically reduce voltage according to volts per hertz when in automatic mode. Industry recommendations/standards (IEEE C37.102 or IEEE C37.106, ANSI C50.13-1989, IEEE C57.12.00-2000) already exist to address volts/Hz. If voltage regulators fail, or are in manual control, then there is additional volts/Hz relaying to trip generation if needed. We believe the volts per hertz issues are already taken care of outside of this UFLS standards document.</p>
<p><b>Response:</b> It is appropriate to include this performance characteristic in this project because overexcitation that occurs as a direct result of UFLS operations must be considered when UFLS programs are designed. The SDT notes that the subject of the cited IEEE and ANSI standards is design and protection of generators and transformers. The proposed Requirement R6.4 (now Part 3.3 of Requirement R3) is a system performance requirement that is coordinated with these standards. If design verification studies demonstrate the potential for generator tripping, corrective measures must be applied to prevent further unnecessary outages or disturbances that would result from tripping the generator.</p> <p>The SDT acknowledges excitation models do not include V/Hz limiters; however, we also believe that meaningful results can be obtained from simulations without the V/Hz limiter. If the simulated system response exceeds the V/Hz performance characteristics in the standard the group of Planning Coordinators would have the option of developing corrective actions as part of the UFLS program design or including additional modeling for generator units to demonstrate that the V/Hz limiter would prevent the overexcitation condition.</p>		
American Transmission Company	No	<p>Please provide the industry with the technical justification for this performance criteria. We are presently unaware of any UFLS event where V/Hz tripped a generator unit. This requirement should not be included with this standard because it cannot be properly simulated. The voltage regulator V/Hz controls are not presently included in generator exciter/voltage regulator models of the present power system modeling programs that are used for dynamic power system simulation. The volts per hertz language does not belong in this load shedding document. Voltage regulators automatically reduce voltage according to volts per hertz when in automatic</p>

Organization	Yes or No	Question 6 Comments:
		<p>mode. Industry recommendations/standards (IEEE C37.102 or IEEE C37.106, ANSI C50.13-1989, IEEE C57.12.00-2000) already exist to address volts/Hz. If voltage regulators fail, or are in manual control, then there is additional volts/Hz relaying to trip generation if needed. We believe the volts per hertz issues are already taken care of outside of this UFLS standards document.</p>
<p><b>Response: It is appropriate to include this performance characteristic in this project because overexcitation that occurs as a direct result of UFLS operations must be considered when UFLS programs are designed. The SDT notes that the subject of the cited IEEE and ANSI standards is design and protection of generators and transformers. The proposed Requirement R6.4 (now Part 3.3 of Requirement R3) is a system performance requirement that is coordinated with these standards. If design verification studies demonstrate the potential for generator tripping, corrective measures must be applied to prevent further unnecessary outages or disturbances that would result from tripping the generator.</b></p> <p><b>The SDT acknowledges excitation models do not include V/Hz limiters; however, we also believe that meaningful results can be obtained from simulations without the V/Hz limiter. If the simulated system response exceeds the V/Hz performance characteristics in the standard the group of Planning Coordinators would have the option of developing corrective actions as part of the UFLS program design or including additional modeling for generator units to demonstrate that the V/Hz limiter would prevent the overexcitation condition.</b></p>		
FirstEnergy Corp	No	<p>The requirement has been devised to protect generators and step-up transformers from over-excitation based on traditional protection guidelines. However, other elements in the BES can also become over-excited. Dynamic simulations look at many quantities such as voltage and frequency but Volts/Frequency is not a common output that is reviewed. It is suggested that it would be better to require that bulk capacitors be tripped if system voltage exceeds equipment limits.</p>
<p><b>Response: The SDT initially considered a requirement to trip capacitors when voltage exceeds equipment limits. However, in developing the requirement the SDT realized that the concern with high voltage during an underfrequency event is the potential for generating units to trip by overexcitation protection, potentially exacerbating the underfrequency condition and leading to a blackout. As such, the SDT believes it is important to focus on the reliability impact on the BES and not how the impact should be addressed such as tripping bulk capacitors. While the SDT agrees that V/Hz is not an output quantity commonly reviewed, the capability does exist to monitor this quantity.</b></p>		
Independent Electricity System Operator	No	<p>The 20 MVA/unit and 75 MVA per generating plant/facility thresholds are the same as those presented in PRC-024, on which we expressed a disagreement. In an islanded situation, each generator's status is critical to ensuring frequency decline is successfully arrested based on the assumption that all on-line generators would not trip within specific frequency bounds unless prior approval has been sought and granted to allow tripping. Not limiting the potential for overexcitation (V/Hz) at the smaller generators/plants exposes the island to a great uncertainty on the amount of generation that can be relied upon to arrest frequency excursion.</p>
<p><b>Response: The SDT believes it is not necessary or practical to assess the potential for tripping of every generator unit. The majority of comments from the industry supported the changes made to this requirement in the second posting. However, the team identified the need to make two</b></p>		

Organization	Yes or No	Question 6 Comments:
		<p>clarifying changes to the requirement. Based on its own review of the requirement the SDT decided to remove any ambiguity as to whether modeling is required when all or only one threshold is met by combining R 6.4.1 and R6.4.2 with “OR” (now Part 3.3.1 of R3). Based on a comment the SDT also added a third threshold in Part 3.3.1 of R3 to clarify our intent to include wind generation, by adding “Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.” Thus, the applicability is limited to locations at which individual generating units greater than 20 MVA (gross nameplate rating) or generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) are directly connected to the BES or any facility consisting of one or more units that are connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating. The SDT believes that the requirement as written generally captures about 95 percent of utility-owned installed capacity. The SDT believes that reliability of the UFLS program is supported by assessing the potential for this amount of generation to trip during events involving off-nominal frequency and voltage. The SDT also has decided to modify Requirements R7.1 and R7.2 (now Parts 4.1 through 4.6 of Requirement R4) to apply to the same generating units and plants.</p>
Xcel Energy	No	<p>No. Criteria in 6.4.1 and 6.4.2 looks like it is only measuring generators that are required to be registered. Yet, with increasing penetration of small generators (&lt;20MVA, &lt;75 MVA aggregate), we feel the scope is not large enough to consider a material impact on the BES by an aggregate of these small generators. (Same concern carries into R7)</p>
		<p>Response: The majority of comments from the industry supported the changes made to this requirement in the second posting. However, the team identified the need to make two clarifying changes to the requirement. Based on its own review of the requirement the SDT decided to remove any ambiguity as to whether modeling is required when all or only one threshold is met by combining R 6.4.1 and R6.4.2 with “OR” (now Part 3.3.1 of R3). Based on a comment the SDT also added a third threshold in Part 3.3.1 of R3 to clarify our intent to include wind generation, by adding “Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.” Thus, the applicability is limited to locations at which individual generating units greater than 20 MVA (gross nameplate rating) or generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) are directly connected to the BES or any facility consisting of one or more units that are connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating. The SDT believes that the requirement as written generally captures about 95 percent of utility-owned installed capacity. The SDT believes that reliability of the UFLS program is supported by assessing the potential for this amount of generation to trip during events involving off-nominal frequency and voltage. The SDT also has decided to modify Requirements R7.1 and R7.2 (now Parts 4.1 through 4.6 of Requirement R4) to apply to the same generating units and plants.</p>
TRE UFLS Standard Drafting Team	Yes	<p>The TRE UFLS SDT believes this change creates a clear definition for equipment at generator buses and step-up transformer high-side buses for which the standard applies. However, the NERC UFLS SDT may want to consider adapting the definition of applicable generating units to conform to NERC’s Compliance Registry Criteria (NERC Statement Compliance Registry Criteria Rev 5.0 (October 16, 2008) <a href="http://www.nerc.com/files/Statement_Compliance_Registry_Criteria-V5-0[1].pdf">www.nerc.com/files/Statement_Compliance_Registry_Criteria-V5-0[1].pdf</a> for Generator Owner/Operator:- Individual generating unit greater than 20 MVA (gross nameplate rating) and is directly connected to the bulk power system;- Generating plant/facility greater than 75 MVA (gross aggregate nameplate rating) or when the entity has responsibility for any facility consisting of one or more units that are connected to the bulk power</p>

Organization	Yes or No	Question 6 Comments:
		system at a common bus with total generation above 75 MVA gross nameplate rating. This change would bring consistency to the definition of applicable generating units and would ensure that there is no confusion for wind farms and other generating plants/facilities.
<p><b>Response: Thank you for your suggestion. The SDT has modified Requirement 6.4 (now Part 3.3 of Requirement R3) to include a reference to “Facilities consisting of one or more units connected to the bulk electric system at a common bus with total generation above 75 MVA gross nameplate rating.”</b></p>		
Colmac Clarion	Yes	Be aware that some small generators (>20 MVA but <75 MVA with 'extended' tielines may have difficulty meeting this requirement with some 'older' voltage regulators and stepup transformer arrangements.
<p><b>Response: The SDT notes that this requirement is not applicable to Generator Owners. The requirement is applicable to Planning Coordinators to ensure that the UFLS program design within each region considers the potential for UFLS program operation to result in high voltage/low frequency conditions that may result in flux beyond design limits of generators and generator step-up transformers. This requirement ensures these impacts are considered during UFLS program design to minimize the likelihood that generation will trip by overexcitation protection which would exacerbate the underfrequency condition, potentially preventing recovery and stabilization of system frequency leading to a blackout.</b></p>		
Alabama Municipal Electric Authority	Yes	The SDT should consider the potential discrepancy with the generator side and their desire to include automatic load reduction. I assume automatic load reduction would not take place at a generator bus.
<p><b>Response: The SDT agrees with the commenter’s assumption that automatic load reduction would not necessarily take place at a generator bus although this is not precluded by the standard.</b></p>		
SPP System Protection and Control Working Group	Yes	Please confirm whether this requirement is applicable for generating stations/ plants connected to BES above 100 kV.
<p><b>Response: This was the intent of the requirement in the second posting. The majority of comments from the industry supported the changes made to this requirement in the second posting. The SDT has decided only to make clarifying modifications to the requirement.</b></p>		
PacifiCorp	Yes	PacifiCorp concurs with the decision of the SDT drafting team. V/Hz capability is generally associated with generating plants, not all buses within a system.
<p><b>Response: Thank you for your support.</b></p>		

Organization	Yes or No	Question 6 Comments:
Luminant Power	Yes	Luminant agrees with the direction of the UFLS SDT. Luminant further requests that the drafting team modify Requirement R6.4 to clarify that the per unit V/Hz limits modeled are 1.18 and 1.10 of Nominal transmission system voltage.
<p><b>Response: Thank you for your support of the SDT direction on this requirement. However, the SDT has decided not to modify Requirement R3.3 to provide the V/Hz base. The SDT believes it is implicit that the V/Hz base is nominal system voltage divided by nominal system frequency, similar to voltage standards which typically refer to per unit voltage without explicitly stating the voltage base.</b></p>		
Ameren	Yes	It is an improvement over the previous draft. However, there are still questions as to whether this requirement is needed. Please provide the technical justification for this performance criteria. We are presently unaware of any UFLS event where V/Hz tripped a unit. This requirement should not be included with this standard because it cannot be properly simulated because the voltage regulator V/Hz controls are not presently included in generator exciter/voltage regulator models that are used for stability simulation.
<p><b>Response: It is appropriate to include this performance characteristic in this project because overexcitation that occurs as a direct result of UFLS operations must be considered when UFLS programs are designed. The SDT notes that this performance characteristic is based on IEEE and ANSI standards applicable to design and protection of generators and transformers. The proposed Requirement R6.4 (now Part 3.3 of Requirement R3) is a system performance requirement that is coordinated with these standards. If design verification studies demonstrate the potential for generator tripping, corrective measures must be applied to prevent further unnecessary outages or disturbances that would result from tripping the generator.</b></p> <p><b>The SDT acknowledges excitation models do not include V/Hz limiters; however, we also believe that meaningful results can be obtained from simulations without the V/Hz limiter. If the simulated system response exceeds the V/Hz performance characteristics in the standard the group of Planning Coordinators would have the option of developing corrective actions as part of the UFLS program design or including additional modeling for generator units to demonstrate that the V/Hz limiter would prevent the overexcitation condition.</b></p>		
ERCOT ISO	Yes	ERCOT ISO agrees with the change.
<p><b>Response: Thank you for your support.</b></p>		
Southern Company	Yes	No additional comment.
Pepco Holdings, Inc – Affiliates	Yes	
Bonneville Power	Yes	

**Consideration of Comments on Underfrequency Load Shedding Program Requirements — Project 2007-01**

Organization	Yes or No	Question 6 Comments:
Administration		
Electric Market Policy	Yes	
SERC UFLS Standards Drafting Team	Yes	
FRCC Standards & Operations Departments	Yes	
Florida Municipal Power Agency and Select Members	Yes	
Cowlitz County PUD	Yes	
City of Bedford	Yes	
US Army Corps of Engineers	Yes	
Central Lincoln	Yes	
Long island power Authority	Yes	
ReliabilityFirst Corporation	Yes	
System Protection & Control	Yes	
ReliabilityFirst	Yes	
AEP	Yes	

Organization	Yes or No	Question 6 Comments:
Ontario Power Generation	Yes	
We Energies	Yes	
NextEra Energy Resources, LLC		No comment.

**7. If you are aware of any conflicts between the proposed standard and any regulatory function, rule order, tariff, rate schedule, legislative requirement, or agreement please identify the conflict in the comments section.**

**Summary Consideration:** Most commenters did not feel that there were any conflicts involving the proposed standard. One commenter raised concerns with historic arrangements relative to tie-line standards, and another commenter raised a concern relative to potential timing inconsistency with Automatic Generation Control (AGC). The SDT does not believe either of these issues would impact the frequency response following a major disturbance that results in activation of a UFLS program. However, the SDT believes that to the extent that such existing arrangements are contrary to the reliability objective of the proposed standard, the Planning Coordinators should model any such contract requirements in their UFLS assessments.

Organization	Question 7 Comments:
TRE UFLS Standard Drafting Team	At this time, the TRE UFLS SDT does not believe this proposed standard conflicts with any regulatory function, rule, order, tariff, rate schedule, legislative requirement, or other applicable standard of which the team members are aware.
<b>Response: Thank you for your input.</b>	
Colmac Clarion	Requirement differ from some current contract requirements that were 'inclusive' of existing tieline standards when written.
<b>Response: The SDT is not aware of how existing tie-line standards would impact the frequency response following a major disturbance that results in activation of a UFLS program. Regardless, the SDT believes that grandfathering of existing arrangements that are contrary to the reliability objective of the proposed standard is unwise and may prove to be a hindrance to the successful implementation of this standard. The Planning Coordinators should model any such contract requirements in their UFLS assessments.</b>	
Alabama Municipal Electric Authority	The SDT should re-look at the timing requirements (4 seconds)in this standard and the timing requirements (such as 6 seconds in the AGC requirement) of other standards.
<b>Response: The SDT appreciates notification of the potential conflict. However, Automatic Generation Control (AGC) is not expected to provide a significant contribution to meeting the frequency recovery performance characteristic in the proposed standard. The performance characteristics in the proposed standard reflect the combined system response resulting from activation of the UFLS program as well as the frequency response of load and generation. As such, the SDT believes there is no conflict in establishing requirements for frequency recovery in a time frame before AGC will be activated.</b>	
Xcel Energy	Not aware of any conflicts at this time.

Organization	Question 7 Comments:
<b>Response: Thank you for your input.</b>	
Southern Company	No Comments for Question #7.
ERCOT ISO	No comment
Electric Market Policy	None
Kansas City Power & Light	Not aware of any conflicts.
IRC Standards Review Committee	None
Public Service Electric and Gas Company	Not aware of any conflicts.
SPP System Protection and Control Working Group	None at this time.
Exelon	Not aware of any conflicts at this time.
We Energies	We are not aware of any conflicts.
PacifiCorp	No comment
NextEra Energy Resources, LLC	No comment.
Luminant Power	None
Ameren	No
FirstEnergy Corp	We are not aware of any conflicts.
Independent Electricity System Operator	None

**8. Please provide any other comments (that you have not already provided in response to the questions above) that you have on the draft standard PRC-006-1.**

**Summary Consideration:**

Comments on this question covered a wide range of topics. Several comments reiterated concerns stated in response to previous questions while some new concerns were raised.

Several commenters raised concern regarding assignment of applicability for developing the UFLS programs to the Planning Coordinators. Concerns included whether the Planning Coordinators are the correct entity (e.g. as opposed to the Balancing Authority), whether compliance could be assessed against a group of Planning Coordinators as opposed to individual entities, and whether the Planning Coordinators should be required to involve other entities or follow their respective regional standard development processes.

- The SDT reaffirms that the Planning Coordinator is the Functional Model entity with the wide-area view and technical skills required to design automatic UFLS programs and perform the UFLS assessments and noted that the Balancing Authority cannot take action in the time frame required to arrest frequency decline and recovery frequency to 59.3 Hz.
- The SDT has removed the group concept and requirements are now assigned to individual Planning Coordinators.
- The SDT noted that while the standard does not require that the Planning Coordinators involve other entities, the Planning Coordinator must work closely with other entities in performance of its role. The SDT has not included a requirement to involve the Distribution Providers and the Transmission Owners in the process because it would be difficult to measure “involvement” and because this involvement is not required to fulfill the reliability objective of the proposed standard. The SDT also notes that the standard should not be prescriptive as to the processes Planning Coordinators should use in designing UFLS programs. A regional standard that involves other entities in the UFLS program design may be considered.

Several commenters requested that the standard include specific requirements on how the UFLS programs should be designed and implemented, such as the amount of load to be shed, frequency thresholds, time delays, and how the UFLS programs will account for the impact of generators that trip above the underfrequency trip curve proposed in PRC-024.

- The SDT replied to these comments by noting that the proposed standard is focused on what reliability goals must be met. The proposed standard allows Planning Coordinators to decide on UFLS design parameters to meet these requirements. The SDT also noted that due to differences in physical system characteristics between regions, the design of the UFLS programs is best left to the Planning Coordinators in each region. Comments received during the two postings indicate industry support for this approach.

Several commenters requested justification for the performance requirements included in the standard.

- The SDT replied that the technical justification for these performance characteristics is to ensure that generation does not trip before the UFLS program has time to operate to arrest frequency decline and recover frequency within acceptable limits. The characteristics in the proposed standard have been coordinated with the trip limitations proposed by the Generator Verification SDT in PRC-024 and with equipment design and protection guides in IEEE standards.

Several commenters requested that the SDT address issues such as requiring generator owners to provide their relay setting data, minimum requirements on generator governing response, limitations on generator tripping for off-nominal frequency, maintenance and testing of UFLS relays.

- While the SDT agreed that many of the concerns raised by commenters are valid, they also are outside the scope of the SAR for this project. Where applicable, the SDT noted existing STDs that are addressing these issues. Specifically, the Generator Verification STD (Project 2007-09) is establishing limitations on generator tripping for off-nominal frequency and requirements for generators to report non-conforming protection settings in PRC-024, and the Protection System Maintenance & Testing SDT (Project 2007-17) is addressing maintenance and testing for all relay types in PRC-005.

Several commenters raised concerns and provided recommendations on requirements involving procedures for coordination with other regions and criteria for selecting islands.

- In response to a variety of comments the SDT deleted requirement R4 and combined other requirements to simplify the requirements for inter-area coordination and criteria for selecting islands to be used as a basis for designing a UFLS program. These revised requirements are contained in Requirements R2 for selecting islands and R5 for inter-area coordination.

Several entities recommended that the proposed standard exclude small entities from requirements to implement the UFLS program designed by the group of Planning Coordinators in their region.

- The SDT indicated this is an aspect of the UFLS program design assigned to the group of Planning Coordinators. The SDT further noted that the group of Planning Coordinators can provide in the UFLS program such allowances as long as compliance with the performance characteristics in requirement R3 (requirement R6 in previous posting) is achieved.

One entity identified potential conflicts between approved reliability standard EOP-003, Load Shedding Plans, and the proposed standard.

The SDT agrees that PRC-006-1 and EOP-003-1 should not include duplicative or contradictory requirements. The SDT has requested and received Standards Committee approval to propose a supplement to its scope to include making conforming changes to EOP-003-1. The Supplemental SAR and proposed revisions to EOP-003-1 have been included with the third posting of PRC-006-1. One entity indicated that the requirement for post-event analysis presently contained in PRC-009 has not been included in the proposed standard, leaving a gap in analysis of events. The entity suggested this must be covered in a reliability standard and should not be referred to ERO Rules of Procedure.

- Upon further consideration, the SDT agreed with the comment and added a requirement to include an assessment of the performance of UFLS equipment and the UFLS program effectiveness (new Requirement R11) within one year of an actuation of UFLS resulting in a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program.

Several commenters requested that the database should include all data required to perform a UFLS Assessment.

- The SDT notes that the database is intended to document the load tripping implemented by Distribution Providers and Transmission Owners to meet Requirement R9. In fulfilling the Planning Coordinator function, the groups of Planning Coordinators have the ability to obtain protection settings they need to model to comply with R4 and R11. Planning Coordinators and Transmission Planners routinely obtain similar data to perform planning studies required by the Transmission Planning (TPL) standards.

Several entities requested that the drafting team propose definitions for several terms to be included in the NERC Glossary, including the terms region, island, underfrequency load shedding (UFLS), and annually.

- The SDT provided explanations of how these terms are used in the proposed standard, and noted that the terms region, island, and UFLS are understood terms used within the industry and the word annually is used as defined in a collegiate dictionary. The team did; however, clarified in the standard that “region” refers to a Regional Entity footprint.

Organization	Question 8 Comments:
TRE UFLS Standard Drafting Team	The TRE UFLS SDT appreciates the opportunity to provide these comments and commends the NERC UFLS SDT for its efforts.
<b>Response: Thank you for your support.</b>	
Bonneville Power Administration	<p>The Applicability should be Planning Coordinators and Balancing Authorities. BPA suggests that everywhere it currently states Planning Coordinator that it be changed to ?Planning Coordinator/Balancing Authority?.</p> <p><b>Response: The SDT believes the Planning Coordinator is the Functional Model entity with the wide-area view and technical skills required to design UFLS programs and perform the UFLS assessments. The Balancing Authority cannot take action in the time frame required to arrest frequency decline and recover frequency to 59.3 Hz within 60 seconds.</b></p> <p>R3. - This needs to say why they are selecting portions of the BES that may form islands. The reason would be "that may form islands to simulate frequency performance and design the UFLS schemes."</p> <p><b>Response: The reason is given in R5 (now R2), “Each group of Planning Coordinators shall identify an island(s) as a</b></p>

Organization	Question 8 Comments:
	<p><u>basis for designing a UFLS program.”</u></p> <p>R5. Second bullet - This should include both "relay scheme or special protection system."</p> <p><b>Response: The SDT agrees with this comment and has revised the requirement (now R2, Part 2.2) accordingly.</b></p> <p>Related to R9. - Each Generator Owner also needs to provide data for their under frequency trip settings, if they are within the band specified, 58.0 Hz to 61.8 Hz, since they also need to be considered in the simulations.</p> <p><b>Response: Per R5 of the first draft of PRC-024-1, the Planning Coordinators will have information on generator under-frequency trip settings that fall outside the acceptable boundary defined by PRC-024-1, Attachment 1 and may include this in their database. Adding such a requirement in PRC-006-1 will create a redundant data requirement already contained in PRC-024-1.</b></p>
<p>Northeast Power Coordinating Council</p>	<p>NPCC has previously commented that the objective to control frequency overshoot cannot be met through UFLS program design alone in the absence of adequate generating unit governing response. Our immediate concern has been addressed by increasing the maximum overshoot limit to 61.8 Hz and we support this modification to the performance requirements. However, we expect this concern will resurface if standards requiring minimum frequency response are not implemented and further declines in system frequency response are observed. NPCC recommends that NERC develop standards for unit governing response that are consistent with and support the reliability objectives of standards PRC-006 (UFLS) and PRC-024 (Generator Performance).</p> <p><b>Response: The SDT agrees, though this is outside the scope of its activities. We suggest you submit this suggestion using a <i>Standards Suggestions and Comments Form</i> – the form can be downloaded from the Standards Resources Web Page, or using the following link:</b></p> <p style="text-align: center;"><a href="http://www.nerc.com/files/Standards_Input_Form_Final_2008June30.doc">http://www.nerc.com/files/Standards_Input_Form_Final_2008June30.doc</a></p> <p>NPCC also notes that it may not be possible for the Planning Coordinators to design a reliable UFLS program that will arrest and recover declining frequency if an excessive number of generators are exempted from meeting the underfrequency performance requirements in PRC-024.</p> <p><b>Response: The SDT agrees, though this needs to be addressed by the Project 2007-09 (Generator Verification) PRC-024 SDT.</b></p> <p>Hydro-Quebec TransEnergie has technical parameters that differ from those specified in Requirements R6 and R7. A Variance will be needed to address those specific concerns.</p> <p><b>Response: A variance for the Québec Interconnection is included in the third posting of the standard.</b></p>
<p>Southern Company</p>	<p>--- R8: It is problematic for a loosely organized group of Planning Coordinators to create and maintain a database. There are</p>

Organization	Question 8 Comments:
	several practical and compliance issues with this. This should be assigned to an entity with clear responsibilities and pro
<p><b>Response: This requirement (now R6) has been reassigned to individual Planning Coordinators. Annual collection of data is desirable in case events need to be analyzed. A database can be any collection or compilation of data the Planning Coordinator chooses.</b></p>	
ERCOT ISO	<p>Comment 1- May need to consider defining the meaning of region (Region) in the NERC Glossary so it is clear for the responsible entities for this standard.</p> <p><b>Response: The SDT intended “region” to relate to the traditional sense of the defined boundaries of a Regional Reliability Organization (RRO) and its successor the Regional Entity. The SDT feels that the concept of a “region” is generally understood throughout the industry and does not believe that a unique definition is required. The term “Regional Entity footprint” replaces “region” in the third draft.</b></p> <p>Comment 2 Will it be necessary for ERCOT ISO to have a procedure for coordinating with groups of Planning Coordinators, since we are essentially a group of one? Maybe language could be added to the standard to clarify for this situation.</p> <p><b>Response: The SDT modified the standard to no longer require a procedure. The requirements are also now assigned to individual Planning Coordinators rather than groups.</b>Comment 3 - It would be appropriate for the load referenced in the imbalance calculation in requirement R6 to include system (island) losses. The standard should be clearer.</p> <p><b>Response: The SDT intentionally excluded island losses from the imbalance definition. The losses within an island are difficult to measure because the losses in the steady-state pre-event condition will change upon formation of the island. The SDT notes that excluding losses results in a slightly more conservative assessment because more generation would have to be online for a given imbalance if losses are included in the equation. In most cases the losses are on the order of 1 to 3 percent; thus while excluding losses is conservative, it is not overly conservative.</b></p>
Midwest ISO Stakeholders Standards Collaborators	<p>R3 requires the Planning Coordinator(s) to consider historical events and system studies that may form islands. Creating islanding scenarios that are not historical events will be highly speculative and require a PC(s) to address hypothetical sequence(s) of events that is unlikely to occur. Further, for larger PCs the number of potential islands could grow significantly if an unlimited number of contingencies are considered. Running dynamic simulations to design coordinated UFLS programs for multiple islanding scenarios would be a huge burden. The SDT should provide criteria for the PC to use in determining UFLS islands similar to that developed for the TPL-004 Category D criteria.</p> <p><b>Response: The SDT recognizes the difficulties that could be encountered in identifying islands. Nevertheless, there may be portions of a system that obviously have a higher likelihood of islanding as compared to others. How extensive an analysis to identify islands needs to be is a judgment that cannot be written into a standard and must be left to the discretion of the Planning Coordinators involved. The standard only requires that criteria for identifying islands be developed, documented and applied.</b></p> <p>R2 We would suggest removing the word "consistent" because the program can not be applied consistently across the MRO</p>

Organization	Question 8 Comments:
	<p>Region. The Canadian systems need to shed more load than the US portion of MRO. We need to focus on coordination issues between geographic areas, not on consistent application across a NERC region. Perhaps what was intended is to state that load shedding should be applied uniformly across any island footprint.</p> <p><b>Response: The SDT agrees with the comment and has revised requirement R3 (that reflects merging of Requirement R2 into R5) with removal of the word, “consistent.”</b></p> <p>R4 - Revise text so that the "agreement" between all entities is well documented through several examples: meeting minutes, a formal agreement to work together, results of common drills, examples of coordination of UFLS models, etc.) We would propose that the assessment for non compliance would be located in the formal agreement to work together since all parties should understand the risk or consequences of the group effort.</p> <p><b>Response: Requirement R4 has been deleted.</b></p> <p>These standards do not appear to consider or address if capacitors should be automatically tripped during UFLS to avoid overvoltage conditions. Do other standards address this or does this draft standard need to be modified?</p> <p><b>Response: The SDT feels that R6.4 (Part 3.3 of requirement R3 in the third draft) appropriately addresses overvoltage conditions without specifying how the volts per hertz requirement should be met. The SDT believes that requiring capacitor tripping in the standard would address “how” to meet the requirement rather than stating “what” reliability objective is being addressed.</b></p>
SERC UFLS Standards Drafting Team	<p>R8: It is problematic for a loosely organized group of Planning Coordinators to create and maintain a database. There are several practical and compliance issues with this. This should be assigned to an entity with clear responsibilities and processes to accomplish the task. Additionally, annually and database is unnecessarily restrictive given the study is only required on a 5 year basis and in light of existing data collection processes. Recommend revision R8 as follows: shall compile/assemble information provided by their Transmission Owners and Distribution Providers for use in UFLS assessments and event analyses. Databases should add value and not create extra work that does not directly contribute to the completion of the study.---</p> <p><b>Response: This requirement (now R6) has been reassigned to individual Planning Coordinators. Annual collection of data is desirable in case events need to be analyzed. A database can be any collection or compilation of data the Planning Coordinator chooses.</b></p> <p>R7.1 and 7.2 could have the effect of shifting the generators burden of staying on line to the load customer who must be shed to account for the generators less-than-expected frequency performance. The generators must be modeled because that is the way they perform, but an exception for frequency support must be difficult for a generator to obtain.---</p> <p><b>Response: The SDT agrees, though, exceptions for frequency support provided by the generators need to be addressed by the Project 2007-09 (Generator Verification) PRC-024 SDT. The current draft of PRC-024 does require documentation and response to technical review by other entities for any non-conforming trip settings.</b></p>

Organization	Question 8 Comments:
	<p>R10 should say "shall implement the UFLS program rather than shall provide load tripping in accordance with the UFLS program because the phrase "provide load tripping could be confusing.---</p> <p><b>Response: The SDT deliberated on the words "shall implement" and while we agree with the intent we feel that "shall provide load tripping" is more explicit.</b></p> <p>R1 through R8: The concept of PC's joining a group to design a UFLS scheme is flawed. Compliance should never be assessed on a group basis. Each PC (or TP) must be allowed to demonstrate compliance to the standard independently so compliant PCs/TPs are not penalized along with the non-compliant one(s). The standard should be applicable to individual PC's/TPs to design their UFLS scheme to meet the other requirements. The performance characteristics insure that the schemes from different PC's/TPs will coordinate. However, if a group approach is mandated, then sub-regional groups must be allowed in lieu of regional groups.---</p> <p><b>Response: Thank you for your comment. The group of Planning Coordinators concept has been removed and replaced by individual Planning Coordinators.</b></p> <p>R4 is an unnecessary complication, and should be deleted. A procedure for identifying islands between Regions is not necessary. What if there are no credible islands between Regions? R5 ensures that when credible islands between Regions are identified that all affected entities jointly study UFLS scheme effectiveness within the island.---</p> <p><b>Response: The SDT agrees and Requirement R4 has been deleted.</b></p> <p>R6: Does this requirement say that performance requirements must be met only at a 25% imbalance? Or is it requiring performance requirements to be met at lower imbalances too? If yes, we recommend performing both a 25% and a 15% imbalance test to add clarification.---</p> <p><b>Response: The requirement indicates that the performance characteristics apply to any percentage between 0 and 25. A number of imbalances need to be simulated to demonstrate that the performance characteristics can be met through the range.</b></p> <p>R10: Does each DP have to specifically meet the UFLS scheme? For example, if the UFLS scheme is for 30% load in 3 steps of 10% each, some small DP's may not be able to achieve that fine a resolution. Some allowance should be made for aggregating DP's to meet the overall scheme. This allowance should be achieved by making the TO responsible for implementing the UFLS scheme. The TO has a wider area of control and responsibility and is therefore in a better position to coordinate the implementation.---</p> <p><b>Response: The group of Planning Coordinators can provide in the UFLS program any such allowance as long as compliance with the performance characteristics in requirement R3 (requirement R6 in previous posting) is achieved.</b></p> <p>Unless there is a high bar in PRC-024 to obtain an exception, this passes the responsibility for generators to support frequency on to the loads (to support frequency by shedding). To compensate this standard needs a requirement for generators which do</p>

Organization	Question 8 Comments:
	<p>not coordinate with the R6 requirements to arrange for load to be shed to make up for their generator tripping.---</p> <p><b>Response: Per R5 of the first draft of PRC-024-01, Generator Owners will need to document, subject to peer review, any generator under-frequency trip settings that fall outside the acceptable boundary defined by PRC-024-1, Attachment 1. Since this standard does not apply to Generator Owners, the preceding comment should be directed to Project 2007-09 which covers PRC-024-01.</b></p> <p><b>The proposed standard allows Planning Coordinators in each region to determine what measures will be included in the program design to account for the impact of generators with trip settings that trip above the curve in PRC-024.</b></p> <p>R7.1: This should not require the modeling trip settings of all generators that trip at or above 58.0 Hz. Since most generators have trip settings for reduced frequency that holds for long periods (e.g. 30 minutes), this would require modeling trip settings of almost all generators. It should only require the modeling trip settings of generators that would trip within the performance envelope defined by R6.1 and R6.2.---</p> <p>R7.2: This should not require the modeling trip settings of all generators that trip at or below 61.8 Hz. Since most generators have trip settings for higher frequency that holds for long periods (e.g. 30 minutes), this would require modeling trip settings of almost all generators. It should only require the modeling trip settings of generators that would trip within the performance envelope defined by R6.3.---</p> <p><b>Response: The SDT agrees and has modified Parts 4.1 through 4.6 of requirement R4 (previously R7.1 and R7.2) to require the modeling of generators with protection settings above and below the frequency-time curves rather than focusing on tripping above or below a specific frequency threshold.</b></p> <p>It is not clear if the standard requires one specific UFLS scheme for the entire Region. One scheme for the Region should not be mandated. Flexibility should be allowed for different schemes within the Region as long as each scheme meets the performance requirements.</p> <p><b>Response: The SDT has addressed this concern by eliminating the word “consistent.”</b></p>
FRCC Standards & Operations Departments	<p>We appreciate the Drafting Teams efforts on this very difficult standard and would offer the following suggested clarifications:R8. Each group of Planning Coordinators shall create and annually maintain a UFLS database containing relay information provided by their Transmission Owners and Distribution Providers for use in UFLS assessments and event analyses. Suggest rewording R8 as follow: R8. Each group of Planning Coordinators shall maintain a UFLS database which identifies the participating Planning Coordinators, contributing entities and contains information (as defined in R9) provided by their Transmission Owners, Distribution Providers and Load Serving Entities for use in UFLS assessments and event analyses.</p> <p><b>Response: The SDT has revised Requirement R8 (now R6) in response to a number of different suggestions from commenters. However, the SDT has not included requirements to identify the participating Planning Coordinators or for Load Serving Entities (LSEs) to provide data. This requirement (now R6) has been reassigned to individual Planning Coordinators. The equipment owners (Distribution Providers and Transmission Owners) are the entities with the data</b></p>

Organization	Question 8 Comments:
	<p><b>required by Planning Coordinators, so there is no reason to include LSEs in this requirement.</b></p> <p>Suggest adding Load Serving Entities to R9.</p> <p><b>Response: The equipment owners (Distribution Providers and Transmission Owners) are the entities with the data required by Planning Coordinators, so there is no reason to include LSEs in this requirement.</b></p> <p>R10. Each Transmission Owner and Distribution Provider shall provide load tripping in accordance with the UFLS program designed by the group of Planning Coordinators for each region in which it operates. Suggest rewording R10 as follows: Each Transmission Owner, Distribution Provider and Load Serving Entity shall provide forecast load tripping in accordance with the UFLS program designed by the group of Planning Coordinators for each region in which it operates.</p> <p><b>Response: The SDT has not added the word “forecast” to the requirement. Because automatic UFLS programs must be planned in advance, the use of forecasted load is considered a given.</b></p>
MRO NERC Standards Review Subcommittee	<p>R1 - Reword the requirement to state the Planning Coordinators within a region shall have an agreement with all the Planning Coordinators rather than creating a new group. (For example similar to agreement requirements between BAs in EOP-001, between GOs and transmission entities in NUC-001, and RCs to form an agreement in IRO-001 R7.) Proposed wording for R1: "Planning Coordinators shall have agreements with all Planning Coordinators in the region, that shall, at a minimum, contain provisions for cover fulfillment of the subsequent UFLS requirements in the standard." This agreement would clarify how "group" responsibilities for compliance and penalties would be assigned to its member entities. For example, would all Planning Coordinators be non-compliant, if one or more members of the group is non-compliant or if a group could not come to consensus on elements needed to fulfill a requirement? Would the financial penalty be shared among the group or would each member be assessed separate penalties?</p> <p><b>Response: The group of Planning Coordinators concept has been removed and replaced with individual Planning Coordinator applicability.</b></p> <p>R2 We suggest the following revised wording, "shall design a load shedding program or multiple load shedding programs so that all areas of the region are covered." In the MRO, the Canadian portions of the system need to shed more load than the U.S. portion of the system. There needs to be coordination within each potential island, but not necessarily consistent across each, entire NERC region. Perhaps what was intended is to state that load shedding should be applied uniformly across an island footprint.</p> <p><b>Response: The SDT has addressed this concern by eliminating the word “consistent.”</b></p> <p>R4 - Revise text so that the "agreement" between all entities is well documented through several examples: meeting minutes, a formal agreement to work together, results of common drills, examples of coordination of UFLS models, etc.) We would propose that the assessment for non-compliance would be located in the formal agreement to work together since all parties should understand the risk or consequences of the group effort.</p>

Organization	Question 8 Comments:
	<p><b>Response: Requirement R4 has been removed.</b></p> <p>R6.1 To match the design emphasis that is included in R6.2 and R6.3, we suggest . . . no less than 58.0 Hz per simulated event.</p> <p><b>Response: The SDT has revised these requirements to refer to frequency-time curves rather than specific thresholds and time durations. The SDT believes that the revised requirements (now Parts 4.1 and 4.2 of R4) address the commenters' concern.</b></p> <p>R8 - Since the interpretation of "annually" can vary widely, we suggest this rewording, "each calendar year and within 15 months of the last update".</p> <p><b>Response: Since “annually” is not defined a NERC term, it has the meaning “occurring or happening every year or once a year.” as found in a collegiate dictionary. The SDT believes the reliability objective of this requirement is met without specifying details of when during the year the requirement is fulfilled.</b></p> <p>R9 If the inclusion of Transmission Owner is determined to be redundant, reword to, Each Distribution Provider shall provide. . . , as noted in response to Q1.b.</p> <p><b>Response: The SDT has decided to retain both the Distribution Provider and the Transmission Owner in the applicability for this requirement. The drafting team provided the rationale for keeping Transmission Owner in response to comments to Question 1B.</b></p> <p>R10 If the inclusion of Transmission Owner is determined to be redundant, reword to, Each Distribution Provider shall provide . . . , as noted in response to Q1.b.</p> <p><b>Response: The SDT has decided to retain both the Distribution Provider and the Transmission Owner in the applicability for this requirement. The drafting team provided the rationale for keeping Transmission Owner in response to comments to Question 1B.</b></p> <p>add R11 - Since reactive power device overvoltage or underfrequency protection may be included to the UFLS program assessment, we suggest adding the Requirement, "R11. Each Distribution Provider and Transmission Owner shall provide its reactive power device overvoltage or underfrequency protection information in the format and according to the schedule specified by the applicable Planning Coordinator." [If this requirement is added and includes the Transmission Owner, then the Transmission Owner should be included in the Applicability section.]</p> <p><b>Response: The database is intended to document the load tripping implemented by Distribution Providers and Transmission Owners to meet Requirement R9. In fulfilling the Planning Coordinator function, Planning Coordinators have the ability to obtain protection settings they need to model to comply with R4 and R11. Planning Coordinators and Transmission Planners routinely obtain similar data to perform planning studies required by the Transmission Planning (TPL) standards.</b></p> <p>add R12 - Since reactive power device overvoltage or underfrequency protection should be included in the UFLS program design</p>

Organization	Question 8 Comments:
	<p>for a specific island, we suggest adding the Requirement, "R12. Each Distribution Provider and Transmission Owner shall provide reactive power device tripping in accordance with the UFLS program designed by the applicable Planning Coordinator for each region in which they operate." [If this requirement is added and includes the Transmission Owner, then the Transmission Owner should be included in the Applicability section.]</p> <p><b>Response: The SDT has added a new requirement R10 that requires Transmission Owners to provide automatic switching of Elements in accordance with the UFLS program design. The SDT believes this general requirement is more appropriate to include both energizing and de-energizing reactive devices or any other system Elements when included by the Planning Coordinators as part of the UFLS program design.</b></p> <p>add R13 - Since generator off nominal frequency protection information may be included to the UFLS program assessment, we suggest adding the Requirement, "R13. Each Generator Owner shall provide its off nominal frequency protection information in the format and according to the schedule specified by the applicable regional group of Planning Coordinators."</p> <p><b>Response: The SDT does not believe this requirement is necessary. Per R5 of the first draft of PRC-024-1, the Planning Coordinators will have information on generator under-frequency trip settings that fall outside the acceptable boundary defined by PRC-024-1, Attachment 1 and may include this in their database. Adding such a requirement in PRC-006-1 will create a redundant data requirement already contained in PRC-024-1.</b></p> <p>add R14 - Since the coordination of generator off nominal frequency protection should be included to the UFLS program design for a specific island, we suggest adding this Requirement "R14. Each Generator Owner shall have evidence that they provided any coordination that is required by the applicable regional group of Planning Coordinators to meet UFLS program specifications."</p> <p><b>Response: The SDT does not believe this requirement is necessary. Coordination between generator off-nominal frequency tripping and UFLS is already being achieved between this standard and draft PRC-024-1.</b></p> <p>It is not clear if the standard requires one specific UFLS scheme for the entire Region. One scheme for the Region should not be mandated. Flexibility should be allowed for different schemes within the Region as long as each scheme meets the performance characteristics.</p> <p><b>Response: The SDT has addressed this concern by eliminating the word "consistent."</b></p> <p>Below is a list of technical requirements or issues the MRO NSRS would like the UFLS DT to consider for either a reference document or for regional variances.</p> <p>A. Limited Number of Island Loads - What allowance should made for Distribution Providers with a limited number of loads in a designated island?</p> <p><b>Response: Planning Coordinators can provide in the UFLS program any such allowance as long as compliance with the performance characteristics in requirement R3 (requirement R6 in previous posting) is achieved.</b></p>

Organization	Question 8 Comments:
	<p>B. 58 Hz Limit - Consideration should be given to circumstances in some islands where a lower frequency limit would allow better UFLS program performance. For instance the the Canadian example mentioned above.</p> <p><b>Response: This may be addressed through a variance as outlined in the NERC Rules of Procedure. The SDT encourages the requestor of a variance to submit its request with a SAR which addresses the variance in detail.</b></p> <p>C. Coordination with the Proposed PRC-024 Standard - Consideration should be given for proper coordination for of this standard (UFLS) with the PRC-024 standard especially with regard to off-nominal frequency settings for generation.</p> <p><b>Response: The SDT coordinated with the PRC-024 Generator Verification Standard Drafting Team (GV SDT) by providing the underfrequency performance curve to ensure that the performance characteristics do not conflict with the generator off nominal frequency capability curve. The SDT will continue to coordinate with the GV SDT.</b></p> <p>D. Reference Document - We think it would be valuable to develop a companion reference document that may contain the following expectations and intentions:</p> <ul style="list-style-type: none"> <li>- The intent of this standard is to ensure UFLS programs are effective, and to the extent possible, that potential problems have been addressed in the design phase.</li> <li>- This standard should achieve an appropriate level of reliability and not just the least common denominator. An evaluation should be made to determine if the minimum load shedding requirement is sufficient and appropriate for a given geographic region. Although no geographic region (potential island) is obligated to exceed the minimum load shedding requirement, load shedding beyond the minumum requirement is encouraged when there is an identified advantage of doing so.</li> <li>- Overall coordination issues are easier to satisfy for programs that shed the minimum amount of load. Such programs will be better behaved over the smaller range of overloads, but the system will collapse if loss of generation (or import) exceeds the amount of load shed. Larger, more aggressive load shedding programs will provide a larger safety net at the expense of wider voltage and frequency deviations, and generation in those areas will need to accept more off-nominal frequency exposure to achieve coordination with load shedding.</li> <li>- UFLS analysis has to deal with considerable uncertainty in a multitude of variables. It is assumed that conflicting performance requirements and tradeoffs will be documented and resolved through application of engineering judgment.</li> <li>- This standard acknowledges that performance measures such as frequency and voltage deviation are subjective. Both voltage and frequency are influenced by hard-to-quantify factors that vary in real time, such as load damping, the net governor response, and inertia of spinning on-line units. Such performance measures can only be applied in consistent fashion to a tightly defined set of qualifying assumptions.</li> <li>- This standard acknowledges that UFLS is basically a last ditch effort to prevent system collapse and that it has limits. It is not possible to achieve desired performance for all of the unlikely events that may occur in real life.</li> <li>- Performance characteristics given in this standard should be treated as design targets or design guidelines. Studies run to</li> </ul>

Organization	Question 8 Comments:
	<p>develop UFLS programs may indicate different design criteria is appropriate as part of the overall compromise that has to be struck between performance and the level of load shedding coverage that is desired.</p> <p>- There is no perfect tool for studying UFLS, and this standard is not meant to prescribe any particular engineering approach to system analysis and review of UFLS performance. For example, the equivalent inertia method allows for sensitivity analysis and broader insight into the frequency decay dynamics. Likewise, the full transient stability case is more useful for simulating actual disturbance conditions including voltage transients.</p> <p><b>Response: The SDT agrees with many of the guiding principles described above, but does not agree that a reference document is necessary. The SDT notes that UFLS programs have existed for forty years and believes that the Planning Coordinators have adequate expertise to understand the requirements of the proposed standard.</b></p> <p><b>The SDT also disagrees that standard requirements should be viewed as design targets or guidelines. The SDT assumes that reasonable assumptions pertaining to load damping and governor response will be made in the UFLS assessments, and that inertia will be representative of the systems studied.</b></p> <p><b>The SDT notes that a UFLS program capable of shedding more than 25 percent of a system’s load would only need to comply with the performance characteristics up to a 25 percent load-generation imbalance. Beyond a 25 percent load-generation imbalance, a UFLS program would not be subject to any NERC imposed requirements, although the Planning Coordinators within a region could devise other performance characteristics that would apply under load-generation imbalance scenarios greater than 25 percent. The SDT understands the concern over larger sub-regional UFLS programs. The SDT recognizes that Planning Coordinators in a region with a 60 percent capable UFLS program, for example, may have trouble complying with the performance characteristics even under a 25 percent load-generation imbalance scenario. The SDT is not convinced that it would be impossible to comply, but can see that it could be more difficult. Assessments that demonstrate the reliability objective of PRC-006 can be met without meeting the performance characteristics in Requirement R6 could be used to support a request for a regional variance.</b></p> <p><b>While the standard does not prescribe any particular engineering approach to system analysis, the SDT believes that dynamic simulations are the only appropriate means of assessing compliance to the performance characteristics in R3 (previously R6).</b></p>
<p>Kansas City Power &amp; Light</p>	<p>1. What is the engineering basis for any of the boundary and threshold criteria established by requirement 6 and its sub-requirements? These prescribed requirements may not fit with already established UFLS systems and to justify the expense of changes there should be a sound engineering basis for doing so.2.</p> <p><b>Response: The technical justification for these performance characteristics is to ensure that generation does not trip before the UFLS program has time to operate to arrest frequency decline and recover frequency within acceptable limits. The characteristics in the proposed standard have been coordinated with the trip limitations proposed by the Generator Verification SDT in PRC-024 and with equipment design and protection guides in several IEEE standards. The SDT does not anticipate that existing UFLS programs will need to be redesigned to meet this requirement (now</b></p>

Organization	Question 8 Comments:
	<p><b>Requirement R3) for load-generation imbalances up to 25 percent.</b></p> <p>R9 requires Transmission Owners and Distribution Providers according to a schedule and format specified by the Planning Coordinator, but does not require Generator Owners to provide generator protection information. Recommend the SDT consider the inclusion of generator information in the appropriate places in these requirements.</p> <p><b>Response: The SDT does not believe this requirement is necessary. Per R5 of the first draft of PRC-024-1, the Planning Coordinators will have information on generator under-frequency trip settings that fall outside the acceptable boundary defined by PRC-024-1, Attachment 1 and may include this in their database. Adding such a requirement in PRC-006-1 will create a redundant data requirement already contained in PRC-024-1.</b></p>
<p>IRC Standards Review Committee</p>	<p>R3 requires the Planning Coordinator(s) to consider historical events and system studies that may form islands. Creating islanding scenarios that are not historical events will be highly speculative and require a PC(s) to address hypothetical sequence(s) of events that is unlikely to occur. Further, for larger PCs the number of potential islands could grow significantly if an unlimited number of contingencies are considered. Running dynamic simulations to design coordinated UFLS programs for multiple islanding scenarios would be a huge burden. The SDT should provide criteria for the PC to use in determining UFLS islands similar to that developed for the TPL-004 Category D criteria.</p> <p><b>Response: The SDT recognizes the difficulties that could be encountered in identifying islands. Nevertheless, there may be portions of a system that obviously have a higher likelihood of islanding as compared to others. How extensive an analysis to identify islands needs to be is a judgment that cannot be written into a standard and must be left to the discretion of the Planning Coordinators involved. The standard only requires that criteria for identifying islands be developed, documented and applied.</b></p> <p>The fourth bullet in R5 is unnecessary since (all assets) (assets in Island 1) (assets in island 2) - .. = (remaining assets not in any other island)Alternatively, the SDT may want to consider a requirement to perform one or more ad hoc stress tests that can be used to define islanding conditions. If PC passes the stress test, than there is no obligation to define an island within the PC; if the PC fails the stress test, than the PC must use the results as a partial (or complete) basis for defining one or more PC islands</p> <p><b>Response: The SDT believes that Part 2.3 of Requirement R2 (fourth bullet of old requirement R5) is necessary to ensure regional coordination, and that if islands are not identified through system studies, historical events or planned islands, then the region as a whole is studied as an island in the assessment. The SDT notes that Planning Coordinators could include conducting a stress test to define islanding conditions as part of their criteria to identify islands to meet Requirement R1 (old requirement R3).</b></p>
<p>Cowlitz County PUD</p>	<p>Past experience has proved from efforts to comply with other data request mandated standards a disconnect on what specific data needs to be on hand for proper modeling. Keep in mind that the DP usually does not have the expertise, including many TOs, on what data will be needed. I would suggest there be a requirement that the PC not only develop the data set required,</p>

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	but actively (not passively) communicate to its DPs and TOs what is required. Simply expecting entities to stumble around in a web site and find the requirements complicates compliance efforts. Please note that I am not an expert in UFLS schemes and offer my limited knowledge as a compliance and distribution engineer. Thank you for the opportunity to join in this venue.
<p><b>Response: The SDT understands the concern and believes that requiring that the data be provided according to the format and schedule defined by the Planning Coordinators in Requirement R8 establishes the “what” is needed to properly conduct UFLS assessments and events analyses.</b></p>	
City of Bedford	Distribution providers with fewer than 10,000 meter should be exempted for the UFLS program because their ability to effect the stability of the electrical grid is minimal and the cost of installing and maintaining the system would excessive.
<p><b>Response: Planning Coordinators can provide in the UFLS program such an allowance as long as compliance with the performance characteristics in requirement R3 (requirement R6 in previous posting) is achieved.</b></p>	
Alabama Municipal Electric Authority	In requirement 10, "R10. Each Transmission Owner and Distribution Provider shall provide load tripping in accordance with the UFLS program designed by the group of Planning Coordinators for each region in which it operates.", it requires the Distribution Provider to provide load tripping. This seems to imply that the Distribution Provider would not be able to satisfy this obligation in aggregate from its Balancing Authority or Transmission Operator through its power supply contracts. The requirement to provide load tripping is especially troublesome for small entities that have only one feeder supplying the load of its end use customers. Additionally a small entity that is registered as a Distribution Provider that has less than 100 MWs of load will provide little help in affecting the frequency of the BES. The SDT should consider a class of Distribution Providers and not all Distribution Providers.
<p><b>Response: Planning Coordinators can provide in the UFLS program such an allowance as long as compliance with the performance characteristics in requirement R3 (requirement R6 in previous posting) is achieved.</b></p>	
NIPSCO	Any standard neededs to be very general- should include the effect of load on frequency; Define what amount of load they require to trip; Include rate of frequency change protection. Only require planned load tripping; Actual load is much more difficult to predict on lower voltage circuits.
<p><b>Response: The SDT tried to be specific on what needs to be accomplished for reliability without being prescriptive on how to meet what is required. The details of the UFLS program such as amount of load tripping are to be defined by Planning Coordinators.</b></p>	
SPP System Protection and Control Working Group	None at this time.
Long island power	Consider rewording R10 to better limit the Compliance aspect for the DP to implement setting UFLS relays based on the

Organization	Question 8 Comments:
Authority	<p>forecasted loads projected for the peak period. Suggest this R10 - The DP once per calendar year shall review the forecasted loads it is serving and provide for UFLS in accordance with the UFLS program designed by the group of planning Coordinators for each region in which it operates.</p>
<p><b>Response: The SDT has not added the word “forecast” to the Requirement. Because automatic UFLS programs must be planned in advance, the use of forecasted load is considered a given. Details as to whether peak load or other load conditions are used as the basis of the program design is left to Planning Coordinators to determine.</b></p>	
Exelon	<p>There is a concern with high frequency requirements because they are not clear as to what should occur or how it should be mitigated. If island frequency is greater than 60.7 HZ for more than 30 seconds what type of action needs to occur? What is the technical justification for these levels?</p> <p><b>Response: The technical justification for this requirement is to ensure that generation does not trip as a result of frequency overshoot following operation of the UFLS program. The overfrequency characteristic in the proposed standard has been coordinated with the overfrequency trip limitations proposed by the Generator Verification SDT in PRC-024. If island frequency is greater than 60.7 Hz for more than 30 seconds the Planning Coordinator should modify the UFLS program design to reduce the level of overshoot, such as by increasing the number of UFLS stages and decreasing the amount of load shed at each stage.</b></p> <p>In the previous Characteristics document the high voltage levels were different than the levels in this draft standard.</p> <p><b>Response: The SDT believes the commenter is referring to the overfrequency limits having changed. The SDT raised the limits based on industry input during the first posting. The limits have been raised to take advantage of generator capability while maintaining coordination with the generator trip limits proposed in PRC-024. Based on industry input in the second posting, the overfrequency limits have been modified again to convert the discrete points to a curve.</b></p> <p>Due to the inherent difficulty in accurately postulating load and generation islands, establishing frequency limits for such islands is even more difficult. There should be a criteria as to how the studies are done (including islanding criteria and size) if there are going to be bounds placed on the frequency result of the simulation.</p> <p><b>Response: The SDT has defined the maximum imbalance between load and generation for which the performance requirements must be achieved. The SDT believes that for imbalances up to 25 percent it is possible to meet the performance characteristics for any island that may form. Details such as the process by which islands are identified are left to Planning Coordinators. The SDT believes that due to differences in physical system characteristics between regions, issues such as how studies are done are best left to the Planning Coordinators in each region. Comments received during the two postings indicate industry support for this approach.</b></p> <p>If the timing components (4,10,20 seconds) are removed, then regions should establish minimum generator tripping standards for load shedding. Unit tripping should be a balance between limiting cumulative damage while at the same time coordinating with</p>

Organization	Question 8 Comments:
	<p>load shedding levels in order to arrest frequency decline.</p> <p><b>Response: The SDT agrees that unit tripping limits should achieve a balance between limiting cumulative damage while at the same time coordinating with load shedding levels in order to arrest frequency decline. This balance is being accomplished on a continent-wide basis by this SDT’s coordinating the drafting with the Generator Verification SDT rather than a regional basis as suggested by the commenter.</b></p> <p>Disagree with requirement 5. Criteria for island formation and the resulting requirements for mitigation should be included in a standard where affected parties may participate through the open and fair NERC process. There should not be some unspecified criteria left up to various entities with no oversight or standardized development process. It would be very difficult if not impossible to determine how islands will be formed and where load will remain intact.</p> <p><b>Response: The SDT believes the standard should define what is required of the Planning Coordinators without being prescriptive as to how the requirements should be fulfilled. The SDT also notes that due to differences in physical system characteristics between regions, the process for identifying islands is best left to the Planning Coordinators in each region rather than attempting to put them into a continent-wide standard. Comments received during the two postings indicate industry support for this approach. A regional standard may be considered if the continent-wide standard is not specific enough.</b></p>
ReliabilityFirst Corporation	SDT has to develop a mechanism to make sure all the loads are accounted for.
<p><b>Response: The SDT has modified the applicability to include both Distribution Providers and Transmission Owners as UFLS entities. It will be up to the Planning Coordinators as to how this objective will be achieved so that the performance characteristics may be satisfied.</b></p>	
Arkansas Electric Cooperative Corporation	R7.2 the wording "... trip at or below 61.8 Hz" implies that any generator with a trip setting below 61.8 must be modeled. If a generator has an UNDER-frequency trip setting below 58 Hz then it falls into this category. Was this the intent? If the intent was to capture those units with OVER-frequency trip setting above 61.8 Hz then the wording needs to be changed to "trip at or above 61.8Hz".The drafting team did a good job.
<p><b>Response: Thank you for this comment. The SDT has modified these requirements to refer to frequency-time curves rather than specific thresholds, and has incorporated your suggestion to specifically refer to <u>overfrequency</u> and <u>underfrequency</u> trip settings.</b></p>	
System Protection & Control	There needs to be clarification as to loads and generation in this standard. If the intent is for the System to be secure for loss of xx amount of generation at summer peak and at winter peak in the planning model then that should be stated. In short, there needs to be further clarification on the relationship in regards to compliance within the Planning Model and the actual System Loads and Generation. Some entities in some regions require compliance with load shed percentages real time, 24/7. Others, only for the summer peak, and others for both summer and winter peaks. While these questions relate to measurements, it would

Organization	Question 8 Comments:
	be beneficial to know beforehand the SDT's thinking on these before implementation begins.
<p><b>Response: The proposed standard leaves this aspect of UFLS program design to Planning Coordinators as long as the performance characteristics (now R3) are satisfied for the load levels assessed (R4).</b></p>	
Duke Energy	<p>--- Similar to the response for 5, the team should consider simplifying the requirements by stating points that are just an offset of the PRC-024 requirements. As noted in the webinar, the overfrequency points do not coordinate with the PRC-024 curve at</p>
<p><b>Response: Thank for your comment. Based on industry input the SDT has replaced the discrete points in the proposed standard with a continuous curve that provides consistent 0.2 Hz margin for time up to 60 seconds.</b></p>	
Illinois Municipal Electric Agency	<p>IMEA recommends the following language from the Background/Information section of the comment form be included under Section B. Requirements, R2: Planning Coordinators may elect to use their Regional Standards Development process to develop the programs (but this is not required) or they may determine that their existing programs fully meet the requirements of this proposed continent wide standard.</p> <p><b>Response: The requirements in the standard are intentionally limited to what an entity must do to support a reliability need. While the SDT agrees that Planning Coordinators may elect to use the Regional Standards Development process to develop the programs, such explanatory text is not appropriate within a reliability standard.</b></p> <p>IMEA believes the standard should only apply to areas where there are required UFLS programs that are in existence and not applied to all load if those loads are already covered in an existing UFLS program.</p> <p><b>Response: To ensure reliability and uniformity of UFLS program objectives, all load must be considered in a UFLS program and all UFLS programs must meet the requirements of the proposed standard, regardless of how existing programs are implemented. This being said, Planning Coordinators have flexibility to make allowances for issues such as what the commenter raises.</b></p> <p>IMEA also recommends that Regional Entities be directed to not include registered functions other than PC, TP, and DP in the applicability section of their region-specific PRC-006 standard.</p> <p><b>Response: Regional Standards may assign applicability to entities not included in the continent-wide standard as long as requirements do not conflict with the continent-wide standard.</b></p>
Hydro-Québec TransEnergie (HQT)	<p>HQT recommends that NERC develop standards for unit governing response that are consistent with and support the reliability objectives of standards PRC-006 (UFLS) and PRC-024 (Generator Performance).</p> <p><b>Response: The SDT agrees, though this is outside the scope of its activities.</b></p> <p>HQT also notes that it may not be possible for the Planning Coordinators to design a reliable UFLS program that will arrest and</p>

Organization	Question 8 Comments:
	<p>recover declining frequency if an excessive number of generators are exempted from meeting the underfrequency performance requirements in PRC-024.</p> <p><b>Response: The SDT agrees, though this needs to be addressed by the Project 2007-09 (Generator Verification) PRC-024 SDT. The current draft of PRC-024 does require documentation and response to technical review by other entities for any non-conforming trip settings.</b></p> <p>HQT, being in the Québec Interconnection, has technical parameters that differ from those specified in Requirements R6 and R7. A Variance will be needed to address those specific concerns in regards to frequency thresholds and parameters.</p> <p><b>Response: A variance for the Québec Interconnection is included in the third posting of the standard.</b></p>
AEP	<p>Wouldn't PRC-006-01 R5 be a SPS with all of it's attendant liabilities. Isn't NERC trying to minimize SPS schemes?</p> <p><b>Response: A relay scheme that intentionally separates a portion of the BES likely would be classified as a Special Protection System (SPS). However, the SDT points out that the proposed standard does not require implementation of such schemes. The standard only acknowledges that such protection schemes may be implemented and requires that in such cases the resulting islands must be included in assessments of the UFLS program design.</b></p> <p>PRC-006-01 R5 and EOP 003-1 philosophy would need to agree. PRC-006-01 R5 is written from the standpoint that one is able to predict island formation whereas EOP 003-1 is written to respond to island formation in whatever form it takes by shedding load (EOP 003-1 R6).</p> <p><b>Response: The SDT also notes that while PRC-006 requirement R5 (now R2) is written from the perspective that one is able to predict some islands to be used as a design basis for the UFLS program, the overall intent of the standard is to design a UFLS program capable of operating reliably in response to island formation in whatever form it takes. Nevertheless, the SDT agrees that PRC-006-1 and EOP-003-1 should not include duplicative or contradictory requirements. The SDT has requested and received Standards Committee approval to propose a supplementary SAR to modify EOP-003-1. The proposed supplemental SAR and conforming revisions to EOP-003-1 have been included with the third posting of PRC-006-1.</b></p> <p>EOP 003-1's purpose is to protect the interconnection whereas PRC-006-01 R5 would seem to require opening up ties. There seems to be a disconnect here. However, if the UFLSDT does goes forward with this thinking, then AEP would suggest small island formation as likely being more successful than large island formation.</p> <p><b>Response: As noted above, the proposed standard does not require opening ties.</b></p> <p>Another interpretation of the two standards would be that PRC-006-01 R5 is intended to be designed as an automatic first option. If that option fails, then EOP 003-1 is to be followed by the transmission operator.</p> <p><b>Response: The SDT believes the commenter's alternate interpretation of the differences between EOP-003 and PRC-006</b></p>

Organization	Question 8 Comments:
	<p>is correct. The SDT has proposed revisions to EOP-003-1 to clarify these differences.</p>
<p>Ontario Power Generation</p>	<p>The SDT should be commended for producing a very good standard. There is one issue however that may negate the outcome of UFLS effort. Maximum permissible frequency overshoot of 61.8 Hz specified in R6.3 appears too high. It would quite likely result in hard to predict loss of many large fossil and nuclear units. Past system disturbances provide enough evidence of such thermal power plant response that typically leads to system collapse. This is a fundamental issue for the design of an effective UFLS scheme. What was the reason for not adopting a lower frequency overshoot value, especially considering that multi-step UFLS schemes should be able to accommodate that?</p>
<p><b>Response: The 61.8 Hz limit on overshoot was selected to coordinate with the generator tripping limits proposed in PRC-024 by the Generator Verification SDT (GV SDT). The GV SDT developed the tripping limits to coordinate with generating unit capabilities as provided by a number of manufacturers. Therefore, this comment should be directed to Project 2007-09 SDT. The SDT notes that even with a multi-step program it may not be possible to limit overshoot to a lower threshold depending on the physical characteristics of the island such as inertia and frequency response.</b></p>	
<p>We Energies</p>	<p>We Energies disagrees with the overall approach that the Standard Drafting Team (SDT) has taken with the latest draft of the continent-wide UFLS standard. FERC rejected the original PRC-006 due to its fill-in-the-blank nature. The continent-wide standard is still a fill-in-the-blank standard with the Planning Coordinator (PC) required to fill in the blanks.</p> <p><b>Response: The SDT disagrees that the proposed standard is a fill-in-the-blank standard. The existing PRC-006 requires that the RROs consider a list of items in developing a program. The proposed standard requires that Planning Coordinators design a UFLS program that meets specific performance characteristics. While the proposed standard is not specific on how the program should be designed, it does establish clear requirements on what performance characteristics the program must meet.</b></p> <p>In addition, the standard does not require the PC to involve the Distribution Provider (DP) and Transmission Owner (TO) in the development of the UFLS program. Also, the standard requires the DP and TO to implement without question whatever UFLS program has been designed by the PC.</p> <p><b>Response: While the standard does not require that the Planning Coordinators involve other entities, the Planning Coordinator must work closely with other entities in performance of its role. Regardless, the SDT believes the Planning Coordinator is the Functional Model entity with the wide-area view and technical skills required to perform the UFLS design and assessments. The SDT has not included a requirement to involve the Distribution Providers and the Transmission Owners in the process because it would be difficult to measure “involvement” and because this involvement is not required to fulfill the reliability objective of the proposed standard.</b></p> <p>We are concerned that the standard places a burden on the DP and TO to shed additional load to make up for generators which trip outside of the criteria specified in draft NERC standard PRC-024.</p> <p><b>Response: The proposed standard does not necessarily require the Distribution Provider and Transmission Owner to</b></p>

Organization	Question 8 Comments:
	<p>shed additional load as suggested by the commenter. The proposed standard allows Planning Coordinators to determine what measures will be included in the UFLS program design to account for the impact of generators with non-conforming trip settings. The current draft of PRC-024 does require documentation and response to technical review by other entities for any non-conforming trip settings.</p> <p>A continent wide UFLS standard must set the minimum level of UF tripping for each Interconnection. The continent wide standard must do this by specifying the minimum amount of loadshed, trip frequency steps, and time delay criteria for UFLS relays.</p> <p><b>Response: The SDT disagrees with this statement. The SDT has proposed and industry comments have generally supported the concept of a responsible entity designing UFLS programs to achieve certain performance characteristics without the standard having to specify the UFLS program details and parameter values.</b></p> <p>The continent wide standard must remain silent on criteria, such as islanding, that is above and beyond the minimum amount of loadshed, trip frequency steps, and time delay criteria. Regional UFLS standards must be the vehicle for going above and beyond the minimum requirements of the continent wide UFLS standard. Islanding is one aspect that can be addressed in regional standards if necessary. If the above comments are not adopted by the SDT, the following additional comments address the standard as written.</p> <p><b>Response: The proposed standard is silent on performance characteristics for islands that may form with a generation-load imbalance greater than 25 percent.</b></p> <p>As mentioned previously, this standard does not have a requirement for the PC to involve the DP and TO in the design of the UFLS program. In addition, the standard requires the DP and TO to implement whatever program the PCs design without any concurrence from the DPs and TOs. There must not be any loopholes in this standard which would force the DP or TO to shed additional load for a generator that could meet the criteria specified in draft NERC standard PRC-024. Therefore, R2 must be revised to add a sentence that requires the PC to involve the DP and TO in the design of a mutually agreeable UFLS program. Similarly, R10 must be revised such that it states that the DP and TO will implement the mutually agreed to UFLS program.</p> <p><b>Response: As noted above, the SDT has not included a requirement to involve the Distribution Providers and the Transmission Owners in the process because it would be difficult to measure “involvement” and because this involvement is not required to fulfill the reliability objective of the proposed standard. Also, the SDT has decided not to be prescriptive as to what measures will be included in the program design to account for the impact of generators with trip settings that trip above the curve in PRC-024.</b></p> <p>Lastly, in the RFC region there are only three PCs. This standard is placing a burden and regulatory risk on these three entities in RFC. It is not consensus for three entities to dictate a UFLS program for an entire region.</p> <p><b>Response: As noted above, the SDT believes the Planning Coordinator is the Functional Model entity with the wide-area view and technical skills required to perform the UFLS design and assessments. The Planning Coordinator is also</b></p>

Organization	Question 8 Comments:
	<p><b>supposed to coordinate with other entities in the performance of its role. The SDT believes the Planning Coordinator is the appropriate entity regardless of the number of Planning Coordinators within a region.</b></p> <p>The last sentence of R4 needs two clarifications. First, the text neighboring entities needs to be defined. It is unclear if the text neighboring entities refers to a neighboring PC, DP, TO, GO, Region, etc. Second, the term assessment needs to be referenced in a more specific manner. Does the term assessment refer to island assessments or the UFLS program assessment required in R7</p> <p><b>Response: This requirement has been removed.</b></p> <p>The last bullet item in R5 needs clarification. First, what is meant by the text at least one island? Does this mean the default island is the Region’s electrical boundaries?</p> <p><b>Response: R5 (now R2) has been modified to state that either the Regional Entity footprint or the interconnection must be identified as an island.</b></p> <p>Second, if a DP or TO’s load is part of multiple islands, what mechanism will prevent the DP or TO being issued conflicting UFLS trip settings (e.g. Island 1 requires the DP to set its relays to trip at 59.0 Hz, while Island 2 requires that same DP to set its relays to trip at 58.7 Hz)?</p> <p><b>Response: The Planning Coordinator must design a UFLS program for application across its footprint and the program design must meet the performance characteristics for all islands studied. If there are still conflicting instructions, the matter should be resolved with the Planning Coordinator.</b></p> <p>R7.1 and R7.2 need to be revised since as these sub-requirements are currently written all units with automatic UF tripping installed would be required to be simulated. Specifically, R7.1 requires units that trip between 58.0 Hz to positive infinity to be simulated and R7.2 requires units that trip between 61.8 Hz and 0 Hz to be simulated.</p> <p><b>Response: These requirements (now Parts 4.1 through 4.6 of Requirement R4) have been revised such that Part 4.1 refers specifically to <u>under</u>frequency and Part 4.2 specifically refers to <u>over</u>frequency.</b></p>
<b>Response: See in line responses.</b>	
PacifiCorp	No comment.
NextEra Energy Resources, LLC	No comment.
American Transmission Company	ATC believes that the SDT should develop official definitions for the following three terms used throughout the document: a) "under-frequency load shedding" (along with under-frequency load shedding program) b) island and region. All three terms

Organization	Question 8 Comments:
	<p>warrant a definition in order to be able to assess whether the plans developed pursuant to the standards are consistent between and among the Planning Coordinators. Although these terms may have some generally accepted meaning, there likely is a difference among Planning Coordinators and those differences could potentially lead to enforcement issues. The failure to define these terms by NERC will result in each Planning Coordinator providing their individual perspective that could result in either gaps in the region or difference in what is meant by an island within a region, and what constitutes an under-frequency load shedding program.</p> <p><b>Response: The SDT believes use of these terms is generally understood throughout the industry and unique definitions are not required in the NERC glossary. The SDT believes the meaning of “underfrequency load shedding” is already understood by industry in implementing the approved PRC standards. The term “island” is used exclusively to refer to a portion of the system that is isolated electrically from the rest of the system. The term “region” is used as it relates to the traditional sense of the defined boundaries of a Regional Reliability Organization (RRO). The term “region” has been replaced by “Regional Entity footprint” in the third draft.</b></p> <p>R2 To make the requirement apply to each PC rather than a group, we suggest this rewording, Each Planning Coordinator shall design . . . that was developed in coordination with the applicable regional group(s).</p> <p><b>Response: The group of Planning Coordinators concept has been removed and the responsibilities have now been assigned to individual Planning Coordinators.</b></p> <p>R2 - To allow appropriate UFLS program differences among islands within a single Regional Entity, we suggest this rewording, " . . . under frequency load shedding programs for consistent application across each island within the Region." Some islands in the MRO need to shed more load than other to achieve reasonable frequency recovery.</p> <p><b>Response: The SDT has addressed this concern in an alternate manner by eliminating the word “consistent.”</b></p> <p>R3 To make the requirement apply to each PC rather than a group, we suggest this rewording, Each Planning Coordinator shall develop . . . in coordination with the applicable regional group(s) to apply to select portions of the Bulk Electric System that are designated as islands?.R4 To make the requirement apply to each PC rather than a group and include corodination within the Region, we suggest this rewording, Each Planning Coordinator shall develop a procedure for coordinating with groups of Planning Coordinators within its Region(s) and groups of Planning Coordinators in neighboring regions . . .R5 To make the requirement apply to each PC rather than a group, we suggest this rewording, Each Planning Coordinator shall identify . . . as a basis for designing a UFLS program with the applicable regional group(s) R6 To make the requirement apply to each PC rather than a group, we suggest this rewording, Each Planning Coordinator shall specify . . . load shedding program in coordination with the applicable regional group(s) that are required to meet the following . . .</p> <p><b>Response: As noted above, the group of Planning Coordinators concept has been removed and the responsibilities have now been assigned to individual Planning Coordinators.</b></p> <p>R6.1 To match the design emphasis that is included in R6.2 and R6.3, we suggest . . . no less that 58.0 Hz per simulated event.</p>

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	<p><b>Response: The SDT has revised these requirements to refer to frequency-time curves rather than specific thresholds and time durations. The SDT believes that the revised requirements (now Parts 3.1 and 3.2 of R3) address the commenters' concern.</b></p> <p>R7 To make the requirement apply to each PC rather than a group, we suggest this rewording, Each Planning Coordinator shall conduct . . . with its applicable regional group(s). R8 To make the requirement apply to each PC rather than a group, we suggest this rewording, Each Planning Coordinator shall create . . . in coordination with its applicable regional group(s) . .</p> <p><b>Response: As noted above, the group of Planning Coordinators concept has been removed and the responsibilities have now been assigned to individual Planning Coordinators.</b></p> <p>R8 - Since the interpretation of "annually" can vary widely, we suggest this rewording, "each calendar year and within 15 months of the last update".</p> <p><b>Response: Since “annually” is not defined a NERC term, it has the meaning “occurring or happening every year or once a year.” as found in a collegiate dictionary. The SDT believes the reliability objective of this requirement is met without specifying details of when during the year the requirement is fulfilled.</b></p> <p>R9 Since the Transmission Owner reference is redundant, we suggest this rewording, Each Distribution Provider shall provide.. ..</p> <p><b>Response: The SDT has decided to retain both the Distribution Provider and the Transmission Owner as UFLS entities in the applicability for this requirement. The drafting team provided the rationale for keeping Transmission Owner in response to comments to Question 1B.</b></p> <p>R10 Since the Transmission Owner reference is redundant, we suggest this rewording Each Distribution Provider shall provide . . .</p> <p><b>Response: The SDT has decided to retain both the Distribution Provider and the Transmission Owner as UFLS entities in the applicability for this requirement. The drafting team provided the rationale for keeping Transmission Owner in response to comments to Question 1B.</b></p> <p>R11 - Since reactive power device overvoltage or underfrequency protection may be essential to the UFLS program assessment, we suggest adding the Requirement, "R11. Each Distribution Provider and Transmission Owner shall provide its reactive power device overvoltage or underfrequency protection information in the format and according to the schedule specified by the applicable regional group of Planning Coordinators." [If this requirement is added and includes the Transmission Owner, then the Transmission Owner should be included in the Applicability section.</p> <p><b>Response: The database is intended to document the load tripping implemented by Distribution Providers and Transmission Owners to meet Requirement R9. In fulfilling the Planning Coordinator function, the Planning Coordinators have the ability to obtain protection settings they need to model to comply with R4 and R11. Planning Coordinators and Transmission Planners routinely obtain similar data to perform planning studies required by the Transmission Planning (TPL) standards.</b></p> <p>R12 - Since reactive power device overvoltage or underfrequency protection may be essential to the UFLS program design, we</p>

Organization	Question 8 Comments:
	<p>suggest adding the Requirement, "R12. Each Distribution Provider and Transmission Owner shall reactive power device tripping in accordance with the UFLS program desinged by the group of Planning Coordinator for each region in which they operate."</p> <p><b>Response: The SDT has added a new requirement R10 that requires Transmission Owners to provide automatic switching of Elements in accordance with the UFLS program design. The SDT believes this general requirement is more appropriate to include both energizing and de-energizing reactive devices or any other system Elements when included by the Planning Coordinators as Part of the UFLS program design.</b></p> <p>R13 - Since generator off nominal frequency protection information may be essential to the UFLS program assessment, we suggest adding the Requirement, "R13. Each Generator Owner shall provide its off nominal frequency protection information in the format and according to the schedule specified by the applicable regional group of Planning Coordinators."</p> <p>R14 - Since the coordination of generator off nominal frequency protection is essential to the UFLS program design, we suggest adding this Requirement "R14. Each Generator Owner shall have evidence that they provided any coordination that is required by the applicable regional group of Planning Coordinators to meet UFLS program specifications."</p> <p><b>Response: The SDT does not believe these requirements are necessary. Per R5 of the first draft of PRC-024-1, the Planning Coordinators will have information on generator under-frequency trip settings that fall outside the acceptable boundary defined by PRC-024-1, Attachment 1 and may include this in their database. Adding such a requirement in PRC-006-1 will create a redundant data requirement already contained in PRC-024-1. Coordination is not required from Generator Owners, but PRC-024 does require documentation and response to technical review by other entities for any non-conforming trip settings.</b></p> <p>Reference Document - Due the number and complexity of the elements that need to be considered to develop effective UFLS program designs and for fulfilling the requirements in this standard (e.g. island identification, number of load tripping steps, frequency settings, time delays, percentage of load per step, system inertia, governor response, etc.), we suggest that a reference document be developed to provide useful information regarding automatic UFLS programs to the applicable entities.</p> <p><b>Response: The SDT appreciates the complexities of designing a UFLS program; however, the SDT notes that regional UFLS programs have existed for forty years and believes that the Planning Coordinators have adequate expertise to understand the requirements of the proposed standard.</b></p>
Luminant Power	<p>Several of the requirements are for a group of Planning Coordinators. From a Compliance perspective, how will the actual requirements be enforced on the group, or will the requirements be enforced on each individual Planning Coordinator?</p>
	<p><b>Response: The group of Planning Coordinators concept has been removed and the responsibilities have now been assigned to individual Planning Coordinators.</b></p>
Ameren	<p>There is nothing in the standard that provides direction in terms of measuring whether an entity has effectively implemented a</p>

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	UFLS program.
	<p><b>Response: Requirement R9 requires that Transmission Owners and Distribution Providers provide automatic tripping of load, and Requirement R10 requires that Transmission Owners provide automatic switching of Elements in accordance with the UFLS program designed by the Planning Coordinator. These requirements establish that the Distribution Providers and the Transmission Owners must implement what is required of them according to the UFLS program design.</b></p>
FirstEnergy Corp	<p>1) On requirement R7.1 we suggest adding the words under-frequency before the phrase trip settings for clarity.  <b>Response: This requirement (now Parts 4.1-4.3 of Requirement R4) has been revised such these Parts refer specifically to <u>under</u>frequency.</b></p> <p>2) On requirement R7.2 we suggest adding the words over-frequency before the phrase trip settings for clarity.  <b>Response: This requirement (now Parts 4.4-4.6 of Requirement R4) has been revised such that these Parts refer specifically to <u>over</u>frequency.</b></p> <p>3) As stated in question 5, the frequency requirements for generators should be in this standard PRC-006 not PRC-024.  <b>Response: The SDT disagrees and has coordinated with Project 2007-09 SDT such that Generator Owner frequency and voltage Requirements can appear in one place (in PRC-024). Coordination between the two SDTs is expected to accomplish the same reliability objectives as if the frequency requirements for Generators Owners were in PRC-006.</b></p> <p>4) The new standard does not properly address the requirements of PRC-009 to analyze the performance of an UFLS program following an under frequency event. If the standard is retire PRC-009, it needs to properly cover the analysis of these events and not refer them to ERO Rules of Procedures. Since PRC-004 covers the analysis of System Protection misoperations and PRC-016 covers SPS misoperations, UFLS events including misoperations also must be covered in a standard to ensure review.  <b>Response: The SDT has added a requirement to include an assessment of the performance of UFLS equipment and the UFLS program effectiveness (Requirement R11) within one year of an actuation of UFLS resulting in a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program.</b></p> <p>5) On requirement R.1 the use of the word region should be replaced with Regional Entity territory for clarity so that region may not be misinterpreted to be RTO region or some other sub-region of a Regional Entity territory. We suggest the requirement be written to say Each Planning Coordinator shall join a group consisting of all Planning Coordinators within the Regional Entity territory it performs the Planning Coordinator function.  <b>Response: The term “region” is used as it relates to the traditional sense of the defined boundaries of a Regional Reliability Organization (RRO). The term “region” has been replaced by “Regional Entity footprint” in the third draft.</b></p> <p>6) We support the following MISO comment. R3 requires the Planning Coordinator(s) to consider historical events and system studies that may form islands. Creating islanding scenarios that are not historical events will be highly speculative and require a</p>

Organization	Question 8 Comments:
	<p>PC(s) to address hypothetical sequence(s) of events that is unlikely to occur. Further, for larger PCs the number of potential islands could grow significantly if an unlimited number of contingencies are considered. Running dynamic simulations to design coordinated UFLS programs for multiple islanding scenarios would be a huge burden. The SDT should provide criteria for the PC to use in determining UFLS islands similar to that developed for the TPL-004 Category D criteria.</p> <p><b>Response:</b> The SDT recognizes the difficulties that could be encountered in identifying islands. Nevertheless, there may be portions of a system that obviously have a higher likelihood of islanding as compared to others. How extensive an analysis to identify islands needs to be is a judgment that cannot be written into a standard and must be left to the discretion of the Planning Coordinators involved. The standard only requires that criteria for identifying islands be developed, documented and applied.</p>
CenterPoint Energy	<p>1. CenterPoint Energy again commends the SDT for addressing the difficult issue of Applicability. CenterPoint Energy suggests the SDT also address the difficult issue of placing requirements within the proper category of reliability standard. CenterPoint Energy recommends placing Requirement 9, dealing with submittal of UFLS data, within a MOD standard (Modeling, Data, and Analysis). CenterPoint Energy believes the UFLS data will be used for modeling to facilitate dynamic simulation studies and, therefore, should be included in an MOD standard.</p> <p><b>Response: The SDT does not disagree with the commenter, but including the requirement in the MOD project may create a reliability gap if the MOD project is not completed before or at the same time as the UFLS project. As a result, the SDT feels that this requirement needs to remain in this standard, at least for the present time.</b></p> <p>2. CenterPoint Energy appreciates the SDT attempt to clarify islanding. However, the SDT may have misinterpreted CenterPoint Energy comments on Draft 1. Reiterating our comment, CenterPoint Energy believes regional and/or predetermined islanding is not always applicable in an interconnection-wide region. In addition, the requirements dealing with a group of Planning Coordinators are also not applicable to an interconnection-wide region, such as WECC and ERCOT. With eight of the ten proposed requirements applicable to a group of Planning Coordinators, it appears eight requirements will be problematic for WECC and ERCOT. CenterPoint Energy recommends the following wording be included in Requirements 1 through 8: This requirement is not applicable in an interconnection-wide region.</p> <p><b>Response:</b> The SDT recognizes the difficulties that could be encountered in identifying islands. Nevertheless, there may be portions of a system that obviously have a higher likelihood of islanding as compared to others. How extensive an analysis to identify islands needs to be is a judgment that cannot be written into a standard and must be left to the discretion of the Planning Coordinators involved. The standard only requires that criteria for identifying islands be developed, documented and applied. <b>The group of Planning Coordinators concept has been removed and the responsibilities have now been assigned to individual Planning Coordinators.</b></p>
Independent Electricity System Operator	<p>(1) We propose R5 to be expanded to require the Planning Coordinators to develop criteria for identifying potential islands, as follows: Each Planning Coordinator shall develop criteria, considering historical events and system studies, to select portions of the Bulk Electric System (BES) that can form an island(s) as a basis for designing a UFLS program. The identified island(s) shall</p>

Organization	Question 8 Comments:
	<p>include:</p> <p><b>Response: It is unclear if the commenter is suggesting that the requirements to develop criteria and to identify islands should be combined into one requirement. If so, the SDT thinks that these two requirements cannot be combined into one requirement because they are describing two separate activities.</b></p> <p>(2) R6 needs to be more precise regarding load. Suppose a station with 100MW of load has 20MW of distributed generation added that is anticipated to be in service during the ULFS calculation period (e.g. summer peak hour). Is the ULFS arming determined on basis of 100MW or 80MW of load. This will make a big difference in Ontario if the GEA attracts significant amounts of the distributed generation.</p> <p><b>Response: The load in the imbalance equation Requirement R6 (now R3) is based on the Planning Coordinator’s load forecast which should be reflected in the power flow model. The 25 percent load-generation imbalance requirement should be consistently applied even if some generation is netted with load. The actual arming would be in accordance with the load amounts specified by the UFLS program designed by the Planning Coordinator.</b></p> <p>(3) The standard should include a requirement for mandatory testing/re-calibration period for both ULFS relays and generator under and over frequency relays. The Generator Operator/Owner needs an obligation to provide this information.</p> <p><b>Response: Testing and recalibration of relays is addressed by the Protection System Testing and Maintenance SDT (Project 2007-17) in PRC-005-2.</b></p> <p>(4) Governor action can help mitigate adverse effects of disturbances that affect frequency. Should this standard include some requirements for governor response?</p> <p><b>Response: The SDT agrees that governor response has a direct impact on recovering frequency and controlling frequency overshoot. However, specifying requirements for governor response is outside the scope this standard. The UFLS program must be designed to meet the performance characteristics for whatever level of governor response is present on the system.</b></p>
Xcel Energy	<p>We feel R6.4 is not complete without consideration of other BES components, such as transformers and reactive devices. To ensure excessive voltage does not cause further damage or perpetuate the situation, we feel these additional components should be considered.</p> <p><b>Response: The reliability objective of this performance characteristic in Requirement R6 (now Requirement R3) is to prevent tripping of generation that would exacerbate the load-generation imbalance. This is the reason the SDT focused on generator busses and generator step-up transformer high-side busses in requirement R3 Part 3.3. The SDT believes that observance of overvoltage limits on other equipment should be addressed by other standards, not a UFLS standard.</b></p> <p>We feel that the use of the word region in R1 is unclear. We assume the SDT intended to refer to the 8 NERC regions? (MRO,</p>

Organization	Question 8 Comments:
	<p>SPP, WECC, RFC, SERC, etc.) If so, please make that clear in the requirement.</p> <p><b>Response:</b> The SDT intended “region” to relate to the traditional sense of the defined boundaries of a Regional Reliability Organization (RRO) and its successor the Regional Entity. The SDT feels that the concept of a “region” is generally understood throughout the industry and does not believe that a unique definition is required. The term “region” has been replaced by “Regional Entity footprint” in the third draft.</p>